UNIVERSITY OF ALBERTA

METACOGNITION
AND LITERACY DEVELOPMENT AT WORK
A DESCRIPTIVE STUDY

BY

MARY NORTON ©

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THE UNDERSIGNED CERTIFY THAT THEY HAVE READ, AND RECOMMEND TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH FOR ACCEPTANCE, A THESIS ENTITLED Metacognition and Literacy Development at Work: A Descriptive Study SUBMITTED BY Mary Norton IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF Doctor of Philosophy.

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ABSTRACT

There has been a resurgence of interest in literacy for employment in Canada. Reports suggest that there is both an increase in demand for literacy for employment and an increase in the level of literacy now required.

To help workers develop their literacy to meet new demands, insights about this higher level of literacy are needed. Hypothesizing that such insights might emerge from research about reading metacognition, I conducted a study aimed at describing and comparing aspects of metacognitive knowledge and of self-regulation of supervisors in an Alberta industry.

Eighteen participants were recruited on the basis of previous ratings on workplace reading tests. Participants were able to meet job reading requirements, but had achieved higher or lower ratings on these tests. I anticipated that differences in metacognition between higher and lower rated reader participants might suggest directions for program planning and instruction. Participants were interviewed about metacognitive knowledge of person, task, and strategy. Then, to collect data about self-regulation, I asked participants to complete three work-related reading activities and to think aloud about how they were reading.

My interpretations of the interview data suggest that there were similarities as well as differences in metacognitive knowledge between the higher rated and lower

rated reader participants. Differences were mainly in the area of metacognitive knowledge of person.

My interpretations of the think-aloud data suggest that participants' self-regulation was generally similar while they read to compare information, and as they read to construct main ideas. Differences in self-regulation between the two groups of participants appeared as they read to find information in a document. Higher rated reader participants accessed background knowledge and employed strategies which facilitated satisfactory task completion. Lower rated reader participants either did not have or did not access this knowledge, tended to use ineffective strategies, and were unable to complete the task independently. These results raise questions about relationships between background knowledge and self-regulation and about transfer of strategy use among reading tasks. They argue against narrowly focused, job-specific approaches to workplace literacy programming and support broader, work-related approaches.

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CHAPTER ONE

INTRODUCTION

Literacy for employment has emerged as a salient issue in Canada. In the 1986 Speech from the Throne, Governor General Jeanne Sauve announced that the federal government was committed to:

> work with the provinces, the private sector, and voluntary organizations to develop resources to ensure that Canadians have access to the literacy skills that are prerequisite for participation in our advanced economy. (Canada. Parliament. House of Commons, Oct.1, 1986, p. 14)

The following fall, Peter Calamai (1988) sounded an alarm in one of his Southam Newspaper Group articles on adult literacy. Two million workers, he reported, would be "trapped in a tightening vice between their own illiteracy and a relentless rise in job demands for reading, writing, and using numbers" (p. 37). Meanwhile, the Canadian Business Task Force on Literacy had been founded in 1985 to "mobilize Canadian businesses to do something concrete" about what was perceived as "the tremendous human and financial costs of illiteracy in Canada" (Illiteracy costs business billions: Task force annual general meeting, 1987, p. 1). To this end, the Task Force commissioned a study about the social and economic costs of illiteracy in Canada (1988). The estimated costs[1] documented in this study have been widely cited in efforts to draw attention to needs for adult literacy development.[2]

In 1990, the Conference Board of Canada conducted a survey of Canadian businesses and reported, "for the first time, the extent of the literacy problem in Canadian business..." (DesLauriers, 1990). That same year, the Hudson Institute published a report about "the key role literacy plays in economic and technological change" (Drouin, 1990). At the same time, results of a national literacy survey suggested a mismatch between workplace literacy requirements and adult skill levels: 24% of Canadian adults could manage routine literacy activities, but could not complete more complex ones (Survey of Literacy Skills used in Daily Activities, 1990). Then, in early 1991, Employment and Immigration Canada (1991) announced a Labour Force Development Strategy intended to address:

> limited ability in reading and writing among more than one-third of the Canadian labour force [which] restricts their capacity to perform efficiently and undertake further training. (p.1)

---

[1] The study drew mainly from U.S. sources and emphasized that the costs were estimates and inconclusive. These qualifications have often been omitted in citations.

[2] Examples of reports citing these costs include Literacy, the basics of growth. (1989). Toronto: Ontario Ministry of Skills Development.; and Perrin, B. (1990). Literacy counts. Ottawa: National Literacy Secretariat.

This attention to literacy and employment is not a new phenomenon, as Canada has at least a twenty year history of literacy programming for employment.[3] The current focus seems to include a new dimension, however. As well as citing a continuing growth in demand for literacy for employment, reports emphasize that there is an increase in the level of literacy development which is required (Canadian Business Task Force on Literacy, 1988; Drouin, 1990; P. Jones, 1991).

A number of arguments are used to explain the need for an advanced level of literacy. The common rationale has to do with the need to increase productivity in order to compete in a deregulated, global marketplace. The Canadian Business Task Force on Literacy, for instance, stated a need for a highly skilled work force "particularly when competing with the Japanese" (1988, p. 13). P. Jones (1991) suggested that competition resulting from the Free Trade Agreement with the United States would lead to an increase in demand for basic skills as low productivity jobs are phased out.

---

[3] In 1967, for instance, a skilled labour shortage prompted the Federal government to introduce the Basic Training for Skills Development program. Post-secondary and other institutions were contracted to provide upgrading in reading, writing and other subjects to enable people to gain employment or to enter skill training programs. For a review of Federal government involvement in literacy training for employment, see Thomas, A.M., Gaskin, C. and Taylor, M.C. (1990). Federal government legislation and Adult Basic Education in Canada. In M.C. Taylor and J.A. Draper, (Eds), Adult Literacy Perspectives (pp.41-55). Toronto: Culture Concepts.

According to Drouin (1990), global competition has intensified because of deregulation arrangements in combination with technological developments; industries have introduced technology in an effort to increase productivity. At the same time, technology use has increased with the shift from an industry-based to a service-based economy. While some have argued that technology use lowers the need for a skilled workforce (Levin, 1983; Rumberger, 1984), others point out that workers using technology require advanced skills in order to analyze situations, solve problems, and monitor their work (Canadian Business Task Force on Literacy, 1988). P. Jones (1991) and Drouin (1990) both suggest that while a number of jobs in the service sector, such as the fast food industry, require minimal skills, the knowledge industries within that sector demand "extensive knowledge and training" (Drouin, p. 52).

Another source of demand for advanced literacy in workplaces, though less commonly mentioned, is a shift from hierarchical management approaches to team management and other participatory methods. Working in teams requires people to solve problems, to work collaboratively, to communicate verbally and in writing with team members, and to make decisions that they previously may not have had to make (Carnavele, Garner, & Meltzer, 1990; Darville, 1990; Jurmo, 1989).

In the face of these changes, it is argued, workers will not only require literacy and other skills to perform a given job, but will need skills enabling them to learn new jobs. According to a number of forecasts, continuous learning will be crucial to economic growth (Carnavele et al., 1990; Drouin, 1990; Morrison and Rubenson, 1989).

Some forecasts emphasize that employers will be faced with retraining employees, rather than replacing them with workers who have more advanced skills (Chisman, 1990). (The youth population is declining [Canadian Business Task Force on Literacy, 1988], and one third of that population does not complete school [Elliott, 1988; Ontario. Office of the Youth Commissioner, 1986]). Other reports focus on workers' needs and rights to develop their literacy in order to participate proactively in changing workplaces (Martin, 1989; Sarmiento & Kay, 1990; Stinson, 1990).

Problem

In order to help workers develop advanced level literacy it is necessary to identify what this level of literacy entails. At present, however, "precise measures of exactly what that means have not been developed" (Chisman, 1989, p. 3).

Existing attempts to define advanced level literacy often include "reasoning" and "problem solving" as aspects of it, along with reading, writing, speaking, and computation (Canadian Business Task Force on Literacy, 1988; Drouin, 1990). This reasoning/problem solving focus suggests that insights about advanced literacy may be emerging from contemporary research about reading metacognition; this research is concerned with metacognitive knowledge, or what readers know about how they read, and with self-regulation, or how readers regulate their reading.

Research with children and with adults in academic settings is pointing to differences in metacognition as a key factor in reading proficiency (Gambrell & Heathington, 1981; Garner & Reis, 1981). When compared to younger children, or to less able readers in the same age group, older and more able readers have a sounder awareness of reading factors and dynamics, are more likely to monitor their reading comprehension, and are better equipped to regulate their reading in the face of difficulties. Research with adults outside of academic settings, while limited in amount and scope, is resulting in similar conclusions (Noe, 1988). There are also indications of a relationship between metacognition and job performance (Mikulecky & Ehlinger, 1986; Mikulecky & Winchester, 1983). Researchers argue that metacognition can be taught, that instruction may be significant in enabling less proficient readers to develop their literacy, and that instruction in metacognition will support transfer of reading skills from one setting to another (Baker & Brown, 1984; Zabrucky & Ratner, 1989).

These findings seem to hold promise for reading development as an aspect of workplace literacy programming (Baker, 1989). However, research about reading metacognition with adults in general, and in their workplaces, is very limited (Baker, 1989; Baker & Brown, 1984; Noe, 1988). Further investigations in workplace settings are required.

To this end, I carried out a descriptive study in an Alberta industry. I identified and compared aspects of metacognitive knowledge and of self-regulation of adults who had achieved higher or lower ratings on reading tests. The findings about metacognitive knowledge and self-regulation might inform literacy program development and suggest questions for further research. Although the findings are relevant for workplace and work related literacy programming, they also apply to literacy programming in other contexts.

Research Questions

1. What are some aspects of participants' metacognitive knowledge of reading, including knowledge of person, task and strategy?

2. How do participants regulate their reading, given different texts and different purposes for reading?

3. What are some similarities and differences in metacognitive knowledge and self-regulation of the higher rated and lower rated reader participants?

4. Are there differences in how participants regulate their reading when reading for different purposes or when reading texts of differing difficulty?

5. Do the differences in self-regulation of higher rated and lower rated reader participants suggest that the higher rated ones are more proficient readers?

6. Is participants' metacognitive knowledge reflected in their self-regulation?

7. How do the findings compare with those reported in the literature?

Significance

There is limited research about workplace literacy in Canada or about reading metacognition with adults outside of academic settings. While more extensive, the U.S. research on workplace literacy has only begun to consider metacognitive aspects of reading. This study contributes to the Canadian workplace literacy research base, and to the research about reading metacognition with adults outside of academic settings.

Delimitations

I conducted the study with 18 male supervisors in a major Alberta industry. Participants were recruited from a larger number of supervisors who had previously completed a company administered reading test. Some had also participated in a follow-up reading assessment.

I interviewed participants and then asked them to complete three reading activities while concurrently verbalizing what they were thinking. The reading activities were representative of reading activities in the participants' workplace.

Limitations

This study has limitations similar to other descriptive studies of reading metacognition. These include the number of participants, which is too small to make generalizations, and limitations of interview and think-aloud methodologies.

Organization

In this chapter, I have introduced the study. In chapter 2, I review the literature and describe the theoretical framework for the study. I include discussions about literacy, particularly as it has been linked to economic development; about reading, workplace literacy and reading; and about metacognition.

In chapter 3, I outline the interview and think-aloud methodology used to collect data, and I explain my approach to analysis. I present the findings in two chapters: Chapter 4 includes a description and comparison of participants' metacognitive knowledge, and chapter 5 describes and compares their self-regulation. The final chapter includes a summary of key findings and an outline of implications for literacy programming and further research.

CHAPTER TWO

THEORETICAL FRAMEWORK

In this chapter, I develop the theoretical framework for this study and review the related literature. I begin by distinguishing between concepts of literacy and reading, and then review perspectives on literacy, including views about relationships between literacy and economic development. I describe the model of reading which underlies this study and review the research regarding workplace reading. I end with a review of the literature on reading metacognition.

Literacy and Reading

While the terms literacy and reading are denotatively similar, they are frequently used in the literature with differing connotations. Literacy usually refers to reading, or to reading and writing, in a social context--the focus is on what one reads and writes and why. In many contemporary reports the notion of literacy is broadened to include a range of basic skills in addition to reading and writing. The focus has still to do with the application of those skills, however.

Most research and discussions about reading, on the other hand, have tended to focus on cognitive aspects rather than social applications. The concern has been with reading skills--what one does to demonstrate that reading is occurring, or, more recently, on the process of how one reads. While recognizing social dimensions as essential components of the reading process, this study was primarily concerned with the cognitive dimensions. Thus I discuss literacy and reading as overlapping concepts, with literacy being the broader one.

Literacy

In the broadest discussions, literacy is often considered in terms of potential outcomes of being literate. For instance, Scribner (1984), using the metaphors of adaptation, power, and state of grace, discussed the ways in which being literate allows individuals to adapt to changing situations, to gain control over their affairs, and to develop their self-esteem. Of these notions, literacy for adaptation has received the most attention under the more common label of functional literacy.

Functional Literacy

While all applications of reading and writing are essentially functional--all literacy activities are carried out for some purpose--functional literacy most commonly refers to those applications which are necessary to survive (Kirsch & Guthrie, 1977-78) or to cope in situations where text is used to communicate needed information. Access to information is highlighted as a key factor in Levine's (1982) definition of both literacy and functional literacy:

> Literacy, in general...becomes the exercised capacity to acquire and exchange information via the written word. Functional literacy is taken to be the possession of, or access to, the competencies and information required to accomplish those transactions entailing reading or writing in which an individual wishes--or is compelled--to engage. (pp. 263-4)

This definition differs from more conventional ones in its suggestion that people could be considered functionally literate if they have access to what is required to carry out a text-based transaction, even if they cannot read or write. By using the term compelled, Levine also makes a stronger distinction than do others between tasks which one may wish to carry out, and those which one must carry out. As well, Levine includes the concept of information exchange, along with that of acquiring information, to underline the importance of writing. In related discussion, he notes that reading--access to information--is often emphasized, while writing--through which one can make one's views and knowledge known--is less emphasized or ignored.

Functional literacy and economic development. Current attention to workplace literacy is apparently rooted in beliefs about relationships between functional literacy and economic development. Chisman (1990) suggests that of the three stakes which a nation has in promoting adult literacy development, the economic one is the most compelling.[1]

---

[1] The other two stakes are humanitarian and civic. As Chisman describes it, the humanitarian stake is concerned with such individual consequences of low literacy as dependence, shame and isolation. The civic stake has to do with people's ability to inform themselves about current

The concept of functional literacy was being promoted as early as the first world war (Clifford, 1984), and according to Levine (1986), it became firmly linked with economic development through UNESCO's post-World War II work in non-industrialized countries. Levine relates the promotion of the economic benefits of literacy development with the emergence of human capital theories. Concerned with the "present value of past investments in training and skills" (Levine, 1986, p. 159), human capital beliefs were, for instance, the foundation for Canadian Federal government literacy development initiatives in the 1960's and 1970's (Faulk, 1987).

A number of arguments have been developed to counter human capital theories.[2] Despite these arguments, human capital theory seems to dominate in current thinking about literacy and economic development. Drouin (1990), for instance, says:

> If organizations, private and public, are to benefit from technological innovation they must have qualified workers. Given an aging population and slower labour force growth, pressures will mount to force organizations to invest, conserve and enhance human capital. (p. 53)

---

issues and to participate knowledgeably in the electoral system.

[2] Levine (1986) argues that employers use levels of education as an indication of potential employees' persistence, discipline and trainability. He cites instances where the literacy requirements to be employed are much higher than the minimal requirements to do the job. Literacy, or education, is thus used as a screening tool for hiring. Faulk (1987) provides a full discussion of such arguments.

Chisman (1990), who defines productivity as "the amount of goods and services created by an individual worker" (p. 5), explains that productivity is influenced by capital, technology and labour skills. He argues that a serious deficit in labour skills has contributed to the slow productivity growth and the resultant weak economy. Chisman suggests that all Americans will be worse off unless steps are taken to upgrade basic skills in the labour force.

Chisman's argument reflects a general trend to link literacy development of individuals with the general economic development of a nation, and hence with increased employment. In Canada and Alberta, for instance, the larger share of literacy funding has been directed towards programming and allowances for unemployed individuals. Harman (1985) points out, however, that employment levels are a function of supply and demand and that unemployment has always existed at some level. He suggests that there would be only very marginal effects on the labour market if functional illiteracy were eliminated.

Harman adds that improved literacy can have an impact on individuals' employability. However Faulk (1987) found that the scope of literacy improvement had to be quite significant in order to have any effect on the quality of employment attained after literacy upgrading. Unless they attained high school or better, adults who participated in adult literacy upgrading programs were likely to be employed in low-wage jobs with no security or prospects for advancement.

Literacy and participation. While most of the current arguments regarding the needs for higher levels of literacy are economically based, there is a tradition of viewing literacy as a requirement for citizenship and participation. The Canadian federal government National Literacy Secretariat, for instance, is primarily concerned with literacy development for participation in society. As another example, Venezky, Kaestle and Sum (1987), in their report on literacy abilities of young adults, cite the need for higher level literacy in order to understand the many issues facing citizens today.

Levine (1986) traces the linking of literacy and citizenship/participation to beliefs that informed citizens were essential for national development. He points out, however, that participatory and political consequences of literacy are highly dependent on such factors as the context in which a person develops literacy, the teacher, and the materials and the philosophy underlying them. In other words, literacy can enable awareness and understanding, but these are not an automatic outcome of being literate.

Democratic principles are beginning to overlap with economic concerns as participatory management is being introduced in some workplaces. Such principles also influence stands being taken by labour organizations concerned with literacy development for their members. Martin (1989) suggests that appropriate training could equip workers with "the social skills and knowledge to handle the intricacies of modern life, rather than being reduced to pawns in someone else's game" (p. 2). Sarmiento and Kay (1990) argue that unions can play a role in helping members respond to changes in the workplace: By promoting literacy development, unions can protect members' job security, increase job advancement opportunities, and expand opportunities for education. Stinson (1990) suggests that unions cannot help but benefit from workplace literacy programs which strengthen workers' aptitude for their jobs and allow greater participation in the union.

Reading

In this study, I use the terms reading and reading comprehension synonymously. I view reading as an interactive,[3] constructive process whereby readers, using the text as a guide, build parallel meaning in their minds.

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[3] Rumlehart (1977) is generally credited for describing an interactive model of reading. Though not as widely cited, the notion of reading as a transaction has also appeared in the literature. Tierney, LaZansky, Raphael and Cohen (1982) likened the reading transaction to negotiations between people. Goodman (1984) suggests that a transaction occurs during reading in that a reader's knowledge changes as he or she reads. My view at this time is that reading is an interaction which can and often does lead to a change in knowledge or view. However, I find the interactive perspective useful in explaining the reading process.

This process of construction is interactive in that it draws on both the text information and on readers' knowledge of what is in the text and of how the text is organized.

The notion of schema is of particular importance in interactive views of reading. A schema is "an abstract knowledge structure derived from repeated experiences with objects and events" (Anderson, Sprio & Anderson, 1978; Garner, 1987). With regards to reading, schemata have been grouped in various categories, most commonly "content" schemata, or knowledge of objects and events, including vocabulary, and "textual" schemata, or knowledge about how texts are organized. According to Flavell (cited in Garner, 1987), readers also develop schemata about how they read. (This will be discussed in a later section on metacognitive knowledge.)

The ease or difficulty with which readers reconstruct meaning from text depends on the degree of match between their schemata and the content and organization of a text, along with their ability to engage cognitive processes, to employ reading strategies, and to apply reading skills. As understood in this study, reading processes are underlying cognitive actions and cannot be directly observed. Strategies are planned approaches a reader might use to achieve a reading goal, and reading processes may be activated through strategy use. A reading skill is an outcome or product of a cognitive action and is usually observable.

Other factors which influence reading include the related dimensions of interest, affect, purpose, and social context or situation. And, as will be discussed in more detail, metacognition about reading, which incorporates the monitoring process and strategy use, is being recognized as an important reader-based factor.

Measuring Reading Development

Definitions and measures of reading may reflect views of comprehension as a product or as a process. Perfetti (1985) for instance, describes a skilled reader as one "who handles ordinary texts with comprehension and reasonable speed" (p.71); similar views underlie reading tests which focus on readers' demonstrated understanding of something they have read. Brown (1976), on the other hand, views effective readers as those who are aware of and in control of their reading strategies. Such a view is concerned with the process of reading.

Stedman and Kaestle (1987) suggest that reading has vertical and horizontal dimensions.[4] The vertical dimension, generally promoted in school, involves vocabulary expansion, concept building, and development of, for instance, inferential and interpretive skills. The horizontal dimension develops as readers, using reading to accomplish practical purposes, engage with a variety of materials in various settings. With increasing awareness of the importance of social context, reading is being recognized as a multiple rather than unitary concept (Beach & Appleman, 1984; Guthrie, Schager & Hutchinson, 1991; Levine, 1986). Some researchers, for instance, distinguish between prose literacy and document literacy, as well as among the purposes for which each type of text is read and the strategies used to accomplish each purpose (Kirsch & Guthrie, 1984).

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[4] Tests of vertical and horizontal literacy can be either process or product oriented.

Viewed from the vertical dimension, reading is considered unitary, and results of reading tests may be thought to apply unilaterally. From a horizontal or multiple-literacy perspective, achievement in one area of reading is not considered a necessary sign of ability in another. However, it is expected that given a variety of reading experiences readers will develop proficiency with a wide range of materials (Kirsch & Guthrie, 1984).

The Statistics Canada Survey of Literacy Skills combined the vertical and horizontal dimensions of reading development in preparing reading test items. The survey developers identified four points or stages on a continuum which they felt reflected "significant differences in [reading] abilities" (S. Jones, 1990, p. 2). At the first and second stages on the continuum, people either have difficulty dealing with print or can use it only for limited purposes, such as finding a word in a sentence. At the third stage, people can use reading materials in a variety of situations if the materials are clearly laid out and the tasks involved are not too complicated. While people at the first and second stages would likely identify themselves as having reading difficulties, people at the third stage generally do not view themselves that way. People at the fourth stage can meet everyday reading demands, although they are a diverse group with wide-ranging reading skills.

The Statistics Canada survey can be criticized in that the test items are not relevant to all people in all communities (Fagan, 1990). The survey tasks do not account for the roles of context, motivation, or relevance in reading. However, the survey report recognizes that in their current situations, many people do not experience difficulty with reading; problems arise when those situations change. Commentaries on the survey results suggest that people at the third stage in the literacy continuum are most likely to be affected adversely by changes in workplace literacy demands.

Considering the range of texts and tasks a reader may encounter, the Statistics Canada survey was essentially a product-oriented test of reading, concerned with whether or not a person could demonstrate comprehension, rather than with how an individual attempted to complete a reading task.

Thus, while results suggest that people who can read at the fourth stage can generally cope with contemporary reading demands, they do not provide insights about how these people read, or about how people at lower stages could develop their reading to that fourth, more advanced literacy stage.

Literacy and Reading in Workplaces

Contemporary research about literacy in North American workplaces was initiated in the late 1960's in conjunction with the growing concern about functional literacy. Sticht (1975) defined functional literacy in workplace contexts as:

> [the] possession of those literacy skills needed to successfully perform some reading task imposed by an external agent between the reader and a goal the reader wishes to obtain. (p. 4)

Referring to literacy in the workplace as occupational literacy, Rush, Moe and Storlie (1986) define it as the ability to "competently read required work-related materials" (p. 1). In recognizing that reading tasks may be imposed or required, both of these definitions share an element of Levine's previously referred to notion of compulsory text-based tasks. However, unlike Levine's, neither of the above definitions include writing. (Rush et al. do note that writing is a vocational literacy related competency). While a few studies have examined writing in the workplace, reading has been the focus of most workplace literacy research.

In a general study of adults' reading habits, Sharon (1973) identified the kinds of materials read at work. In a Canadian study aimed at identifying generic skills for occupational task performance, Smith (1974) also inventoried the types of reading--and writing--which workers say they do. Both studies identified that a wide range of texts are read at work.

As well as reading a range of materials, workers read for a significant portion of their work day. Analyses of time spent on job reading indicated that workers read from a median daily time of one hour (Sharon, 1973) to almost two hours (Diehl & Mikulecky, 1980). In fact, reading at work accounts for most of the daily reading in which many adults engage.

While significant time is spent on reading, the importance of reading at work has been debated. In Sharon's (1973) study, a large percentage of workers said that their job reading was very important. However, Diehl and Mikulecky (1980) found that workers rated reading as vital to completing a task for only 21% of the tasks identified. In most instances, reading was considered helpful, but not necessary to completing a job task, since necessary information could be obtained from another source. By Levine's definition, non-reading workers in these situations could be considered functionally literate. Diehl and Mikulecky themselves suggested that rather than an increase in demand for literacy in the workplace, there was an increase in the opportunity to use print. However, this suggestion has not been reiterated in their reports on later studies.

Attempts to quantify workplace literacy requirements have relied on grade level measures. Grade levels are usually determined by applying a readability formula, such as FORECAST (Sticht, 1975) or Dale-Chall or Fry (Rush et al., 1986) to a selection of texts from a worksite. The limitations of readability formulae have been recognized; in particular, they cannot account for workers' background knowledge, nor for the availability of contextual cues. However, readability findings have been used to support the notion that the level of literacy demands is increasing in the workplace. One study with 100 workers from a cross-section of occupations revealed that 70% of their reading material had a reading level in the grade 9-12 range (Mikulecky, 1988).

In an analysis of reading requirements in the navy, Sticht (1977) distinguished between two main classifications of reading: reading-to-do, and reading-to-learn. He found that 75% of reading on the job was of the first kind, wherein text information is referred to, but not learned. Diehl and Mikulecky (1980) found a similar pattern of reading in civilian worksites, with 11% reading-to-learn, and 63% reading-to-do. The other 26% was reading-to-assess, an additional category identified by Diehl and Mikulecky, in which the reader quickly reads a text to determine its usefulness for another person or for some later task.

These categories of reading tasks have been used to identify differences between reading in schools and in workplaces. Mikulecky (1982) compared high school, technical school, and workplace reading requirements and found that the majority of reading in school is reading-to-learn (66%), in contrast to the high incidence (70%) of reading-to-do tasks of the worksite. Chang (1983) reached similar conclusions in a study of reading requirements of plumbers in training and of plumbers on the job.

Sticht (1977) suggested that because of the cognitive requirements of reading-to-learn, school reading would be more difficult than reading on the job. He found that because workplace reading is highly repetitive and contextualized, workers could read job materials that were up to two levels higher in difficulty than the general-type materials they could read.

Initially, Diehl and Mikulecky (1980) concurred with Sticht, suggesting that the information processing demands of reading at school were quite different from those of reading at work. They urged that this distinction be accounted for in developing literacy tests so as not to raise unnecessary barriers for people with low reading ability. However, in his 1982 comparison of school and workplace reading, Mikulecky reached different conclusions. He suggested that school students read less often than workers on the job, that the material in school is easier and read in less depth, and that students may employ less effective strategies than workers.

Such findings about differences between school and workplace reading requirements have been widely quoted (The Bottom Line, 1988; Canadian Business Task Force on Literacy, 1988; Park, 1984), and have been used to argue whether schools are--or should be--preparing students for the workforce. Related studies have been used to raise questions about the transferability of reading skills from school to the workplace. In one such study, Sticht (1977) found that employees who developed literacy in conjunction with job training retained their literacy skills; skills gained by employees in school-type programs were not maintained.

Recent considerations of the problem of transferability of reading skills from school to work suggest that the problem may not result from reading-to-learn/reading-to-do differences, but from other differences in reading demands in the two situations. Feathers and Smith (1987), while not referring specifically to the workplace, noted that in the "real world" people set meaningful purposes, consult multiple print and non-print sources, and compare and evaluate the information as it is gathered. This point is reiterated in most of the literature on the workplace--

reading is ubiquitous and workers consult a variety of sources, including other people, for information (Mikulecky, 1988).[5]

Feathers and Smith (1987) found little of this kind of reading occurring in high school classrooms which they observed. Rather, reading was single-text focused, teacher directed, and unrelated to the outside world. Emphasis was on acquiring information rather than on using it to address issues and problems. This suggests that the important distinction between school reading and workplace reading is in how people access, synthesize and evaluate information from text and other sources to achieve their purposes.

Feathers and Smith advocate the teaching of strategies for using and evaluating multiple sources of information, and studies of workplace literacy have begun to take a similar focus. Askov and Aderman (1990) report that where workplace literacy programs have tended to focus narrowly on workplace reading skills, there is a trend to broader based programs which promote a wider range of literacy development. There has been a shift away from emphasizing the reading-to-do/reading-to-learn dichotomy, which focuses on outcomes of reading, to considering the underlying processes and strategies of reading. In this regard, metacognition has begun to be considered as an important factor in reading on the job.

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[5] Differences between school based and real world reading were used to explain the relatively low reading levels of young adults reported in the Survey of literacy skills used in daily activities (Statistics Canada, 1990). It was suggested that younger adults had not become familiar with a full range of reading activities.

Metacognition

Metacognition refers to "one's own knowledge concerning one's cognitive processes or products or anything related to them" (Flavell, 1976, p. 232). Metacognition is thought to play an important role in a range of cognitive endeavours such as language acquisition, oral communication, writing, problem solving, and learning, as well as reading (Brown, 1975; Flavell, 1979). Research about metacognition was initiated by developmental psychologists and has emerged in reading research during the last decade.

Contemporary writing about metacognition and reading often cites Flavell (1976, 1979), who has considered metacognition in general, and Brown (1975), whose study of metamemory is considered a foundation for current work on metacognition and reading comprehension. In the literature, the terms metacognition, cognitive monitoring, and comprehension monitoring are often used interchangeably. However, as Baker and Brown (1984) point out, these concepts are hierarchically related: Cognitive monitoring is one aspect of metacognition, and comprehension monitoring is a type of cognitive monitoring.

Flavell (1979) described cognitive monitoring as occurring through the interactions of four phenomena: metacognitive knowledge, or what people know about themselves as learners or readers; metacognitive experiences, or awareness of cognitive difficulties or failure; goals (or tasks); and actions (or strategies). In later writing, Flavell (1987) focused on metacognitive knowledge and metacognitive experiences as two key components of metacognition. In a synthesis of the literature on metacognition and reading, Baker and Brown (1984) described two interactive categories of metacognition: knowledge of cognition (metacognitive knowledge), and self-regulation of cognition. According to Baker and Brown, self-regulation includes monitoring as well as such mechanisms as checking, planning, testing, revising and evaluating the strategies one uses for learning.

Although the term metacognition has come into use only since the 1970's, activities which are now considered metacognitive had been considered, both generally and in relation to reading, some decades earlier. As cited in Brown (1982), Binet (1909) identified factors of general intelligence--invention, direction of thought, and criticism--which are similar to what are now considered metacognitive features of learning. Brown also notes that Spearman (1923, cited in Brown, 1982) identified "self-regulation" as central to thinking and reasoning, and claimed that "people...have the power to observe what goes on in their minds" (p.30). With regards to reading, Brown (1982) cites Dewey (1910) and Thorndike (1917) as having considered the roles of such self-regulatory activities as planning, checking, and evaluating.

Garner (1987) and Brown (1987) trace the current research and discussion about metacognition to two sources: the work of developmental psychologists regarding metacognition and individuals' capacity to reflect on experience, and the investigations of cognitive psychologists concerned with information processing and the role of executive control. Garner and Brown acknowledge that some confusion exists in the field because of these differing roots, with their distinct languages and research methodologies. However, Garner suggests that there is overlap between the two areas; the main distinction has to do with relative emphasis. The area of metacognition has been concerned mainly with the knowledge learners bring, or fail to bring, to a task (metacognitive knowledge), while the area of executive control is concerned with the control mechanisms learners bring or fail to bring to a situation (self-regulation).

In the last two decades, interest in reader-based knowledge and the development of interactive models of reading spurred research about reading metacognition, although it was not labelled as such. For instance, Smith

(1967) compared strategies used by good and poor readers, as did Olshavsky (1976-77). The term metacognition has been used in the reading literature since the late 1970's, with research tending to focus on aspects of metacognitive knowledge, or on aspects of self-regulation.

Metacognitive Knowledge

Baker and Brown (1984) defined metacognitive knowledge as having to do with a person's knowledge about his or her cognitive resources, and about the match between those resources and a task at hand. According to Flavell (1979), metacognitive knowledge includes one's knowledge and beliefs about three categories of factors which affect people's cognition: person, task, and strategy.

The person category includes all that one comes to believe about oneself and about other people as thinking beings, and includes three sub-categories: 1) knowledge about differences in one's own nature ("intraindividual differences"), 2) knowledge about differences between people ("interindividual differences") and 3) "universals of cognition".[6]

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[6] An example of an intraindividual difference is knowing that I learn better by reading than by listening. Knowing that reading aloud will be stressful for one person, but not for another, is an example of knowledge of an interindividual difference. Universals of cognition are generalizations about thinking which we come to believe, e.g., in order to learn, we have to attend to what we are learning.

The task category includes 1) one's knowledge about the information one has available to complete a task, and 2) the demands or goals of the task. The first sub-category includes knowing how the amount and the organization (structure) of information will affect the reading task. An example of the second sub-category is knowing that some tasks are more demanding than others.

The strategy category includes all the knowledge one acquires about what strategies are likely to be effective in accomplishing the goals of various cognitive activities. Flavell (1979) defines strategies as behaviours used to accomplish cognitive or metacognitive goals. While adopted for my study, this definition is not universally used in the literature. Olshavsky (1976-77) posed a compatible definition by suggesting that a reading strategy is a purposeful means of comprehending an author's message. However, others (Mikulecky & Ehlinger, 1986) have used the term strategy to refer to such activities as identifying key concepts and summarizing key ideas. These activities might be more aptly labelled skills; Baker and Brown (1984) in fact refer to such activities as metacognitive skills. Flavell himself distinguishes between cognitive strategies, (strategies employed to reach goals), and metacognitive strategies (strategies used to monitor whether goals are being reached). A specifiic strategy may have a cognitive or metacognitive use, depending on how it is applied.

Flavell suggests that metacognitive knowledge is not different from other stored knowledge (schemata). While metacognitive knowledge may be called up through a conscious search, it also may be activated automatically; the latter seems to be the more common case. Once called up automatically, it may or may not enter consciousness and can influence the cognitive activity in either case. As with all knowledge, metacognitive knowledge can be inaccurate and can fail to be activated or fail to have much influence when activated.

Flavell's description of metacognitive knowledge has been used as a framework for studying it. Myers and Paris (1978) compared the metacognitive knowledge of reading of younger and older children. They found that the older children were more aware of meaning as a goal of reading, and that they reported more strategies to deal with comprehension problems. Gambrell and Heathington (1981), using the Myers and Paris study as a model, compared the metacognitive awareness of adult disabled and able readers. They found that the disabled readers perceived reading as a decoding, rather than a meaning-oriented process, and that they reported few reading strategies. Norman and Malicky (1986), while not working under the metacognitive rubric, found similar perceptions among beginner-reader adults.

Self-regulation

In this study, the term self-regulation is used in a comprehensive way to include the interactive phenomena of metacognitive experiences, selection and use of strategies and other reader based knowledge, and monitoring.[7]

According to Flavell (1979), metacognitive experiences are any "conscious or affective experiences that accompany and pertain to any intellectual enterprise" (p. 906). For instance, one might be aware that a task may be difficult, and hence require careful planning and monitoring. Metacognitive experiences can occur before, after or during a cognitive enterprise and they can vary in length from fleeting to lengthy. They can change cognitive knowledge, influence cognitive goals, and can activate strategies.

Strategies, as already defined, are the planned activities a reader might employ to achieve a reading goal. Strategies may be selected before a reading task is started, they may be changed during a reading task if the ones in use are not effective in reaching a reading goal, and as discussed below, they may be activated as a result of comprehension failure.

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[7] In the literature, the terms self-regulation and monitoring are sometimes used interchangeably. Other times, monitoring is used with reference to awareness of comprehension failure, and self-regulation to the use of repair strategies to address such failure.

Monitoring is the check on whether one is comprehending or achieving one's reading goal. It is thought that readers usually monitor unconsciously, and while it seems possible that readers can be aware of their comprehension when it is proceeding smoothly, they are more likely to be conscious of comprehension when it is not going well. Such instances of awareness are one kind of metacognitive experience. Examples of such "triggering" experiences (Wagoner, 1983) include awareness that a line of thought is not unfolding as predicted, or awareness that there are too many unknown concepts (Baker & Brown, 1984).

Monitoring may or may not result in strategy activation. For instance, a reader who is aware of comprehension failure may employ a "repair" strategy, or may decide not to take remedial action if the reading task is not considered important. Motivation is also a factor in whether strategies are employed (Garner, 1987).

Studies of self-regulation have considered readers' monitoring, usually their awareness of comprehension failure, and readers' use of strategies. Studies of the latter have focused on strategy use in general, or on the use of repair strategies in relation to comprehension failure.

Studies about monitoring have employed error-detection activities. In these, participants are asked to read texts which have been altered to disrupt meaning; they are then questioned to determine if they noted that they were no longer understanding (Garner 1980). Error-detection studies have also made use of computers: Text is revealed line-by-line and text lookbacks are counted as an indication of monitoring (Baker & Anderson, 1982). Unaltered texts, in conjunction with questions, have also been used to assess monitoring (Schommer & Surber, 1986).

In some instances, error-detection studies have been extended to include examination of the use of "repair" strategies, usually through verbal reporting. Studies of general strategy use have employed introspective and retrospective interviews (Martin, 1988; Olshavsky, 1967-77), written reflection (Feathers & White, 1987), and think-aloud procedures (Garner, Wagoner & Smith, 1983; Lundeberg, 1987).

Results of self-regulation studies are usually tentative due to small sample sizes, lack of replication, and problems with tasks and materials. However, the collective findings suggest that 1) self-regulation is developmental, for instance, older and better readers are more likely to be aware of miscomprehension and are more likely, but not always, to take remedial action; 2) metacognition does not necessarily develop independent of instruction (Baker & Brown, 1984); and 3) many remedial strategies are available and may be used in highly individualized ways (Wagoner, 1983). Based on these conclusions, approaches for teaching metacognition are being developed and advocated (Duffy, Roehler & Hermann, 1988; Palinscar & Ransom, 1988).

In general, research about metacognition and reading has considered the differences between younger and older readers (Garner, 1980), between better and poorer readers (Gambrell & Heathington, 1981; Garner, 1980; Martin, 1988), and between experts and novices in a subject area (Lundeberg, 1987). Most of the research in metacognition has concerned children in elementary or high school (Garner, 1980; Garner & Reis, 1981; Olshavsky, 1977-78) or college students (Baker, 1979; Baker & Anderson, 1982; Feathers & White, 1987).[8] Few studies have been conducted with adults outside of academic settings, and only recently has reading metacognition been considered in workplace research.

Metacognition and Workplace Reading

Recent research about workplace reading has considered metacognition as a factor related to job performance and as an attribute of successful readers. In a study about reading and job performance, Mikulecky and Winchester (1983) found that nurses who were rated as superior job performers were more likely than those rated as competent or adequate to demonstrate metacognitive knowledge of reading strategies, although there were no differences in reading ability as measured by a reading test. Similar conclusions were drawn from a later study with electronic workers (Mikulecky & Ehlinger, 1986). Noe (1988) identified the metacognitive knowledge of successful adult readers in a workplace, with a view to developing reading instruction.

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[8] While research has identified differences in metacognition, the question of why there are differences in metacognition among people has not been widely addressed. Questions remain, for instance, about relationships between cultural background and/or schooling and metacognition.

While these studies focused on workers' metacognitive knowledge, my study attempted to identify and compare both the metacognitive knowledge and the self-regulation of participants who had achieved higher or lower ratings on reading tests in a worksite.

Summary

In this chapter, I developed the theoretical framework for this study and reviewed the related literature. I distinguished between concepts of literacy and reading, and reviewed perspectives on literacy, including views about relationships between literacy and economic development. I described the model of reading which underlies this study, reviewed the research regarding workplace reading, and concluded with a review of the literature on reading metacognition.

CHAPTER THREE

DESIGN OF THE STUDY

Like most research about metacognition and reading (Kamil, Langer and Shanahan, 1985), this study is a descriptive one. I have aimed to "describe and develop a special kind of understanding for a particular social situation, event, role, group or interaction" (Locke, Spirduso & Silverman, 1987, p.84), namely the reading metacognitive knowledge and self-regulation of supervisory workers. I conducted the study with 18 front-line supervisors, all male, who had been recruited on the basis of previous ratings of reading ability: All participants were able to meet job related reading demands, but had achieved higher or lower ratings on reading tests. Half of the participants were grouped according to their higher ratings on these tests, and half were grouped according to their lower ratings.

I drew from the qualitative research paradigm to collect and analyze data. I interviewed participants about their metacognitive knowledge. Then, to gather data about self-regulation, I observed them as they carried out three reading activities and verbalized concurrently what they were thinking about (think-aloud). After analyzing and categorizing interview and think-aloud protocols, I displayed the findings in matrices and compared the results for the two groups. This chapter describes these processes and other aspects of the study design.

The Setting

I conducted this study in a major resource industry in Alberta. In the late 1980's, industry management initiated a program of supervisory development which includes assessment and training in a range of supervisory skills. Reading comprehension was identified as one area for supervisors' development, and I was engaged as a consultant to develop a program of reading assessment and instruction. In that capacity I became familiar with the industry, conceived of this study, and gained support for conducting it.

The most natural setting for conducting this study would have been the yards, shops, offices and meeting rooms where participants do their actual workplace reading. (Some workplace reading studies have been carried out in such environments [Mikulecky & Ehlinger, 1986; Mikulecky & Winchester, 1983]). However, it was not possible for me to conduct interviews at participants' worksites due to time limitations and safety regulations. Instead, I met with participants at the company's supervisory development centre offices, and introduced reading tasks related to their work.

Identifying and Recruiting Participants

Since the purpose of the study was to make comparisons based on participants' rated reading ability, I had to decide on a criterion for making these ratings. In related studies, participants have been selected according to results on standardized reading comprehension tests, often in combination with expert judgement (Garner, 1980; Feathers & White, 1987). I used a similar combination to identify potential participants, namely scores on the Industrial Reading Test (Psychological Corporation, 1976-77) which all participants had taken, and results of reading assessment interviews which I had previously conducted with most of the participants, as part of the reading program I had developed.[1]

The Industrial Reading Test (IRT) includes memos, instructions, and other passages about topics related to industry. Passage readability, according to the Fry Readability graph, ranges from grade 9 to grade 15. The test is timed, and comprehension is assessed on the basis of answers to multiple-choice questions which accompany each of the passages.

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[1] From information about the Survey of literacy skills used in daily activities (S. Jones, 1990), I estimated that the texts presented in both the Industrial Reading Test (IRT) and in the reading assessment interview were in the 4th stage of literacy development. As survey information describes, people who are able to read materials at this stage generally are able to meet everyday reading demands. However, these people are a diverse group, and the range of reading skills in the group is wide. From the IRT and other reading assessment results, I inferred that all of the participants in this study were in the stage 4 range, but that they had differing skills within this range.

The IRT is similar to standardized reading tests and is subject to the same criticism. Standardized reading tests do not always account for differences in reader-based knowledge, and the task of reading a passage and answering multiple choice questions is not typical of real reading tasks.[2] For such reasons, I did not rely solely on the IRT as a means for identifying participants.

As part of the company's supervisory development program, supervisors who had achieved less than 80% on the IRT had been referred for individual reading assessments. The assessment included a brief interview about reading habits and strategies, and a series of three reading activities which required participants to locate information in documents, to identify main ideas in a passage, and to identify differences in content between two sets of guidelines. I made judgements about reading abilities on the basis of accurate completion of the activities and observations about how individuals completed them.

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[2] The Industrial Reading Test has also been criticized by one reviewer because the questions are not passage dependent. Sabers (1985) suggested that the test is actually a test of background knowledge. This criticism suggests that people might score higher on this test than on others which required reading of the test texts, but I did not find this to be the case in my study.

As a result of the reading assessment interviews, some supervisors were referred for instruction in one of three sections in a reading program. Section A was for supervisors who had completed the reading activities with relative ease, but who were interested in "brushing up" on reading strategies. Sections B and C had been designed for people who had experienced some difficulties in completing the reading assessment activities. The courses for these sections provided instruction and practice in a range of reading strategies; section C was longer and slower paced than section B.

A number of supervisors who took part in the reading assessment interviews, i.e., supervisors who had not achieved 80% on the IRT, were judged as not needing review or instruction. These supervisors generally attributed their lower-than-criterion scores on the IRT to stress, distractions or disinterest.

I considered supervisors who had participated in the reading assessment as potential participants for this study. Initially, supervisors who had been referred for instruction in Sections B and C of the reading course were considered for the lower rated reader group, and those who had not required instruction, or who had been referred to Section A of the reading course, were considered for the higher rated reader group. Then, since I had noted a general relationship between IRT scores and reading assessment interview outcomes, I decided to seek some additional higher rated reader group participants from among supervisors who had achieved 95% or higher on the IRT.

After identifying a pool of potential participants, I prepared a memo explaining the study and inviting participation, and supervisory development centre staff distributed the memo. A small number of supervisors responded and additional supervisors to whom the memo had been sent were recruited through follow-up phone calls by supervisory development centre staff. At the start of each interview, I reviewed the purpose for the study and outlined the data gathering procedures. I informed participants that information they provided was confidential, asked them if they agreed to take part in the study, and told them that they could terminate the interview at any time. I also asked for permission to use information from the previous reading assessment interviews and from the reading courses in which some had participated.[3]

I had intended to include 25 people in the study, based on time, budget and the availability of participants. Two of the recruited participants were unable to attend the scheduled interview and could not be replaced. Then, although I did interview five supervisors who had taken part in Section A of the reading course, I decided to omit the results of their interviews from the study in order to have equal numbers of people in each of the higher rated and lower rated reader participant groups. The resulting eighteen participants seemed sufficient in light of previous studies about reading metacognition which have involved as few as two participants (Martin, 1988), six participants (Feathers & White, 1987) and up to 16 (Gambrell & Heathington, 1981) or 18 participants (Garner & Reis, 1982).[4] Olshavsky (1976-77) preferred an "indepth analysis of a small sample because it was judged superior for obtaining information about strategies" (p. 658). Depth of information is often advocated over breadth for descriptive studies (Patton, 1990).

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[3] Since participants were recruited by industry staff, and because they were attending interviews at an industry site and often on work time, I was concerned that some people might feel somewhat compelled to participate. However, some of the potential participants who were contacted after the memo was distributed did decline to participate, and two merely did not show up. One of the supervisors who did participate seemed somewhat ill at ease at the start of the interview, but declined my offer not to proceed.

By the time of the study, potential participants for the lower rated reader participant group had all completed a reading course. I expected that these participants would have learned particular reading strategies, and I was aware that some might have developed to a "higher rated reader" stage. I anticipated that this might be demonstrated as they completed the reading activities in this study, and had this occurred, I would have regrouped participants according to their performance on these activities. While performance on two activities was similar for both groups of participants, differences on a third activity suggested that I maintain the original groupings. Table 3.1 shows how participants were grouped according to test and assessment results, after omitting the "Section A" supervisors.

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[4] Related workplace studies conducted by Mikulecky and his colleagues have involved 27 and 29 participants (Mikulecky & Ehlinger, 1986; Mikulecky & Winchester, 1983).

Table 3.1

Selection and Grouping of Participants

	HIGHER RATED READERS									LOWER RATED READERS								
	I[a]				II[b]					I[c]				II[d]				
	[e]20	21	23	24	1	2	3	4	8	6	11	16	19	5	13	14	15	19
Reading course					Not referred					B	B	B	B	C	C	C	C	C
IRT	95 or above				79	76	79	79	74	53	47	74	29	74	37	47	-	-
Supervisor in:																		
Tailings		+											+	+				
Mine Mobile					+		+	+				+			+			+
Welding			+			+					+							
Carpentry									+									
Electrical										+								
Loss Management		+																
Employment Loss				+														
Mine Projects																+		
Experience(years)																		
Supervisor	5	.3	3	5	10	4	5	13	11	7	2	6	8	5	10	11	1	3
Employee	13	4	6	10	10	9	5	13	12	15	12	12	12	9	13	13	10	9
Education[f]	HS	U	HS T	U	T	10	11 T	11 T	9	10	10 T	T	-HS	7 AU	9 T		T	6 T

[a] Participants who passed the IRT.
[b] Participants who did not pass the IRT, but who were not referred for instruction.
[c] Participants who took part in section B of the reading course.
[d] Participants who took part in section C of the reading course.
[e] Numbers were assigned according to the order in which participants were interviewed.
[f] HS= High School; Numbers= grade completed; U= University; T= Trades program; AU= Academic Upgrading.

As shown in Table 3.1, participants in each group worked in a variety of areas in the industry. The majority of supervisors in both groups had been employed with the company for 9 or more years, but the average tenure (11.6 years) of the lower rated reader participants was longer than that (9.1 years) of the higher rated ones. Although participants' supervisory experience ranged from less than a year to 13 years, the average tenure as a supervisor of 6.3 years (higher rated readers) and 5.9 years (lower rated readers) was almost the same for both groups.

Data Gathering Methods

I had two main considerations in developing data gathering methods. One was that the methods would enable an externalizing of cognitive processes and provide "rich data bases" for analysis (Garner et al., 1983). The other was a need for triangulation of methods and data sources.

Triangulation, or the "combination of methodologies in the study of the same phenomenon" (Denzin cited in Jick, 1979), can provide an internal check on the accuracy of data and "improve the probability that findings and interpretations will be found credible" (Lincoln & Guba, 1985, p. 305). According to Denzin, triangulation can be achieved by using multiple and different methods and sources, among other approaches.

I addressed both needs by using two data gathering methods: an interview, and a think-aloud procedure. The think-aloud procedure, in particular, is thought to enable externalization of cognitive processes.

Interview

I used a semi-structured interview to collect information about metacognitive knowledge (see Appendix A). I based the interview questions on Flavell's description of metacognitive knowledge, which has also provided a framework for previously mentioned interview studies (Gambrell & Heathington, 1981; Myers & Paris, 1978). I also included questions about reading habits in and out of work, in part to establish a context for the other questions. However, responses to these questions implied beliefs about and attitudes towards reading. As well, I asked participants to review a series of newspaper headings and to tell me which ones they would read about and why; I wanted to see if there was a relationship between rated reading ability and views about literacy as means to keep informed. Finally, I asked participants who had taken part in a reading course to evaluate the reading course. This information was gathered at the request of the company, but it also provided some insights about the strategies participants felt they had learned.

Used as a means to investigate metacognitive knowledge, interviews do have limitations (Baker, 1989; Garner, 1987).

Readers may be unaware of comprehension processes which they engage automatically, or they may not be able to articulate what they are aware of. As well, the interviewer can inadvertently cue respondents' answers (Garner, 1987). There may be differences between what readers say they do and what they actually do, they may report what they think they should be doing, or they may fail to mention what they think is too obvious (Ericsson & Simon, 1980). Affective factors, such as perceived lack of ability or lack of interest, can also interfere with accurate reporting (Garner, 1987).

Further, studies which have incorporated both interview techniques and behaviourial components have often shown inconsistency between what children say they do and what they actually do (Garner & Kraus, 1981-84; Myers & Paris, 1981), and similar inconsistencies have been found in studies with college students (Phifer & Glover, 1982). For all these reasons, caution in relying on interview data is encouraged, but interviews are not ruled out (Baker and Brown, 1984; Baker, 1989). Rather, interviewers should, for instance, guard against cuing respondents, and against asking about automatic processes or processes not currently used (Garner, 1987). As well, interview data should be used in conjunction with other data. I considered Garner's suggestions in developing the interview questions, and used the interview in conjunction with reading activities and a think-aloud procedure.

During the first two interviews I found it necessary to clarify some questions; I revised these and used the revised questions in the subsequent interviews.

Think-aloud Procedure

To collect information about self-regulation, I asked participants to complete three reading activities, and to think aloud, or to "say everything they think and everything that occurs to them while performing the task..." (Flower & Hayes, 1981). As necessary, I reminded participants to think aloud, and I observed them for indicators of metacognitive experiences, strategy use, and monitoring (e.g., puzzled looks, verbalizations, underlining or other marking, pointing, page turning). When I made such observations, I prompted participants to tell me what they were thinking. Such observation/prompting methodology has been employed by Garner et al. (1982) and by Lundeberg (1987).

Think-aloud methodologies were made popular in problem solving research and have been employed in research about reading and writing (Afflerbach & Johnston, 1984; Flower & Hayes, 1981; Olshavsky, 1976-77). Think-aloud methodologies are intended to elicit information similar to what may be sought in interviews, but some of the concerns about interviews do not apply to the think-aloud procedures. (Garner, 1987). For instance, participants are reporting on what they are doing in an actual situation, rather than in a supposed or recalled situation. Problems do exist with think-aloud methodologies nonetheless. These include inadvertent cuing by the researcher, lack of verbal facility of the participant, and the possibility of participants being unaware of automatic processes, even while engaging them (Garner, 1987). While concerns about cuing can be addressed by the researcher, other concerns remain.

Think-aloud methodology has also been criticized on the grounds that talking while doing a task is thought to interfere with the process of doing it. Ericsson and Simon (1980) addressed this criticism in a review of research entailing verbal reports; they concluded that "verbalizing information is shown to affect cognitive processes only if the instructions require verbalization of information that would not otherwise be attended to" (p. 215).

In some studies, participants are provided with demonstrations of think-aloud procedures prior to being asked to engage in the procedure themselves. Like Lundeberg (1987) I decided not to demonstrate the procedure in order to avoid cuing participants. While some participants in my study expressed initial amazement at the request to think aloud, all willingly "gave it a try." Although there were variations in the extent and nature of their verbalizations, all participants were able to "think aloud" as they read.

Reading activities

Many studies of self-regulation have employed artificially disrupted texts, so that monitoring could be assessed by whether readers noted the disruptions or not. Winograd and Johnston (1982) pointed out a number of problems with this approach and for these reasons others (Wagoner, 1983) advocate the use of naturalistic texts.

Baker and Brown (1984) suggest that people are more likely to take active control of a learning task when it is of intermediate difficulty: If a task is too easy it may be ignored; if too difficult, the learner may give up. Thus, for this study, it was necessary to include texts which were sufficiently difficult to pose a challenge for the higher rated reader participants, but which were not so difficult as to be beyond the capacity of lower rated ones.

I selected three sets of natural[5] texts from or related to the worksite: a task analysis and safe job procedure for loading "big chunks" of earth into hauling trucks; a page of short articles about events of the past year from the company newspaper; and the Alberta Occupational Health and Safety Act and An employer's guide to the Occupational Health and Safety Act. I used actual or exact copies of the texts (see Appendix B).

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[5] While the texts were natural in that they were actual items from the workplace, I recognize that the context for reading them, i.e., the interview setting, was not a natural one.

When using naturalistic texts, it is not possible to identify ahead of time where comprehension may be difficult or where actual comprehension failure may occur. Therefore, one cannot set points for assessing such aspects of self-regulation as monitoring or strategy use. To address this, Schommer and Surber (1986) redefined monitoring failure as a reader's failure to answer a question while being confident that he or she has comprehended. In this study, I set a purpose for each reading activity. Achieving the purpose comprised the comprehension criteria. (This procedure of setting purposes for reading is consistent with Lundeberg's [1987] study.) I expected that participants would employ self-regulation behaviours in order to achieve the purpose. Monitoring failure could then be defined as a participant's failure to achieve a purpose while being confident that he had.

To reflect the varied nature of workplace reading, the purposes included comparing information for differences in content; selecting articles of interest to people in the worksite and stating the main idea of them; and finding a specific item of information in the Occupational Health and Safety Act. I included the last activity in particular because finding information in documents, manuals and other texts is a frequent requirement in workplace settings (Guthrie, Seifert & Kirsch, 1984; Mikulecky, 1982). Further, researchers have begun to argue that the cognitive processes involved in locating information differ from, and need to be distinguished from, the processes of comprehending a passage (Dreher & Guthrie, 1990).

Framework for Data Collection

Metacognitive knowledge about reading and self-regulation of reading were the focus for this study. Flavell's (1979) description of metacognitive knowledge (person, task and strategy) provided categories for investigating metacognitive knowledge. In this area, I considered person variables, including participants' estimations of their reading ability, their views of themselves as readers, their views about differences between more and less able readers, and their generalized beliefs about reading. I considered task variables, including participants' beliefs about sources of difficulties in texts, and their views about the general purpose and importance of paperwork within the workplace and the need for reading at work. I also considered strategy variables, including awareness and use of strategies for various reading tasks and for addressing comprehension difficulties.

The framework for collecting data on self-regulation was based on Baker and Brown's (1984) description, which included metacognitive experiences, strategy use, monitoring and strategy revision.

Data Analysis

I followed similar but separate procedures to analyze the interview data and the think-aloud data for each reading activity. I reduced interview and think-aloud protocols to categories, displayed the categorized data in matrices, and used the matrices to make comparisons between participant groups and with the literature (Miles & Huberman, 1984).

Interview Protocol Analysis

I used a constant-comparison method (Glaser & Straus, cited in Lincoln & Guba, 1985) to reduce the interview protocols. Similar methods of data reduction have been used in other studies of metacognition and reading (Feathers & White, 1987; Lundeberg, 1987; Martin, 1988; Olshavsky, 1976-77).

I reviewed each interview protocol and extracted "chunks" (Miles & Huberman, 1984) or "units" (Lincoln & Guba, 1985) for subsequent coding. I determined units according to two criteria suggested by Lincoln and Guba: 1) They were heuristic, and 2) they were the smallest pieces of information that could stand by themselves.

Once all information was unitized, I sorted it, using both deductive and inductive approaches. First, I grouped the units in pre-determined categories and subcategories of metacognitive knowledge (person, task, and strategy). As I did this, I found that some units did not fit any of the subcategories; rather, they implied new categories which were relevant. I also found that some of the units, while fitting one category or subcategory, also fit into others. I made copies of the units and grouped them in the additional categories. In the course of sorting, I developed and recorded rules for including units in the categories.

I included interview data for all of the participants in the sorting process. This approach differed from Lundeberg (1987), for example, who examined the protocols of expert readers separately from those of novice readers. Since the purpose of this study was to first identify the metacognition of the higher rated and lower rated reader participants, it seemed appropriate to first categorize all of the data. Once I had categorized the interview data, I organized it in matrices as a basis for making comparisons and drawing conclusions.

I relied on intra-rating and inter-rating procedures to check the sorting. First, I chose six participants randomly and reclassified all the units from their transcripts, using the categories already established (Olshavsky, 1976-77; Lundeberg, 1987), and reaching agreement of 90% or greater (Miles & Huberman, 1984). From the six participants, one was randomly chosen and the units were reclassified by a topic expert, again reaching 90% or higher agreement.

Think-aloud Protocol Analysis

The procedure I developed for analyzing the think-aloud protocols was similar to one described by Garner (1987). First, I reviewed each protocol, identified pertinent units which reflected self-regulation, and deduced/induced categories and sub-categories for these units. I did not separate the units from the complete protocol, as I found that the units only made sense in context. Once I was satisfied with the categorization, I abstracted the pertinent categories and sub-categories and used these to represent each participant's self-regulation behaviour. I then grouped and compared the categories for the higher rated and lower rated readers.

To analyze and organize data from the first reading activity, I drew from Baker and Brown's description of self-regulation and I used common strategy labels. I found, however, that these categories were only partly useful for analyzing and organizing data from the other two reading activities. The second reading activity was primarily concerned with identifying and constructing main idea statements, and the third was an information seeking activity. Through a review of the literature on main idea construction on differences between prose and document reading, I found models to analyze and organize the data for these activities. I drew from frameworks on main idea statement and construction developed by Cunningham and Moore (1986), and by Afflerbach (1990) and Afflerbach and Johnston (1986), and I used an information seeking framework described by Guthrie (1988) and by Dreher and Guthrie (1990). I describe these frameworks in chapter 5.

Summary

In this chapter, I described the setting for this study and explained how participants were recruited and selected. I outlined data gathering methods and addressed their potential limitations. Finally, I described procedures and sources for analyzing and organizing data.

CHAPTER FOUR

FINDINGS: METACOGNITIVE KNOWLEDGE

In this chapter, I describe and compare aspects of participants' metacognitive knowledge about reading. Metacognitive knowledge has to do with people's knowledge about their cognitive resources and about the match between those resources and a given task (Baker and Brown, 1984). According to Flavell (1979), metacognitive knowledge includes knowledge and beliefs in three categories: person, task, and strategy. I used these categories to develop interview questions, to analyze the interview protocols, and to organize the findings.

Metacognitive Knowledge: Person

The person category of metacognitive knowledge refers to people's beliefs about themselves and other people as thinking beings (Flavell, 1979). Within the person category, I considered participants' beliefs about themselves as readers and about why people may be more or less able readers. I also considered their generalizations about reading.

Participants' Beliefs about Themselves as Readers

Self-rating of Reading Ability

I asked participants to rate their reading ability in comparison to the ability of others they work with (see Table 4.1). There was a slight relationship between their previous, external rating and their self-rating of reading ability. For instance, three higher rated reader participants said they were more able and two lower rated reader participants said they were less able; no higher rated reader participants rated themselves as less able, and no lower rated reader participants said they were more able. However, the majority of both the higher rated and lower rated reader participants said they were "average."

Table 4.1

Self-rating of Reading Ability

	HIGHER RATED READERS									#	LOWER RATED READERS									#
	I				II						I				II					
	[a]20	21	23	24	1	2	3	4	8	9	6	11	16	19	5	13	14	15	18	9
Average/on a par		+			+	+	+	+	+	6		+	+	+	+	+	+	+		7
More able	+		+	+						3										
Less able											+				+[b]					2
Oral reading diff.																		+		1
Slow/slower		+				+	+			3	+	+		+				+	+	5

[a] numbers were assigned according to the order of participants' interviews (see chapter 3).
[b] average compared to those he supervises, "way down" when compared to people with "grade 12".

In a survey of adult reading habits and attitudes, Smith (1990) asked people to rate their reading ability on a five point scale, using the following definition of good reading: "the ability to combine information in the text with what one already knows" (p. 55). He found that adults with higher levels of education rated their reading ability higher than did those with less education. A review of participants' backgrounds does not show the same relationship between self-rating of reading ability and educational background (see Table 4.2). The three higher rated reader participants who rated themselves as more able had completed high school or university, but those who rated themselves as average had completed anywhere from grade 9 to grade 11, and one had completed university. The one reader who rated himself as less able had completed grade 10, a higher grade than what had been completed by some participants who rated themselves average.

Table 4.2

Self-rating of Reading Ability/Educational Background

	HIGHER RATED READERS									#	LOWER RATED READERS									#
	I				II						I				II					
	20	21	23	24	1	2	3	4	8	9	6	11	16	19	5	13	14	15	18	9
Average/on a par		+			+	+	+	+	+	6		+	+	+	+	+	+	+		7
More able	+		+	+						3										
Less able											+				+[a]					2
Participants' education[b]	HS	U	HS T	U	T	10	11 T	11 T	9		10	10 T	T	-HS	7 AU	9 T	-	T	6 T	

[a] said he was average compared to co-workers, but "way down" compared to people with grade 12.
[b] HS= High School; Numbers= grade completed; U= University; T= Trades program; AU= Academic

Participants' self-ratings in this study may reflect the fact that they were comparing themselves to people they work with, rather than to a standard such as Smith's. As one participant who rated himself average commented, "None of us are scholars and readers" (13). As well, some participants may have been reluctant to say they were better than co-workers. One participant did distinguish between comparing himself with co-workers and with others who had more education: "With the people I work with, I'm normal or standard to that group; with people with grade 12, I'd be way down" (5).

Attitude Towards Reading and Self-perception as a Reader

I asked participants about their outside of work reading habits in order to develop a broader sense of context (see Table 4.3). Their responses do not suggest a relationship between participants' rated reading ability (previously rated and self-rated) and outside of work reading habits. However, some suggestions about participants' attitudes towards reading and about their views of themselves as readers did emerge from their responses.

Three participants in each group reported that they did read outside of work. One higher rated reader participant said that he reads "a lot" (24),[1] and one lower rated reader participant said that he read "whenever I get the chance" (14). Both these participants also said they like to read.

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[1] He reported that he belonged to a book club, frequented bookstores and generally had four or five books in progress at a time. This participant was the only one to report this extent of outside of work reading.

However, the majority of both the higher rated and lower rated reader participants reported limited outside-of-work reading. Six higher rated reader participants said they did not read very much, or that they read very little. Six lower rated reader participants had similar responses; one replied that he read very little, two answered by saying what they read, namely, the newspaper, and two answered no.

Table 4.3

Reading Outside of Work

	HIGHER RATED READERS									#	LOWER RATED READERS									#
+ yes	I				II						I				II					
- no	20	21	23	24	1	2	3	4	8	9	6	11	16	19	5	13	14	15	18	9
Do you read outside of work?																				
Yes				+			+		+	3		+			+		+			3
No										1	+			+						2
Not much/very little	+	+	+		+	+		+		6						+				1
The newspaper													+					+		2
Comments																				
A lot				+						1										
Whenever I can																	+			1
I like reading				+						1							+			1
More than before												+								1
Less than before	+								+	2										
I make time												+								1
I should make time											+									1
No time	+							+	+	3										
Waste of time [a]	+									1										
What do you read?																				
Newspaper	+	+	+	+	+	-	+	+	+	8	+	+	+	+	+	-	+	+	+	8
Magazines		+	+		+		+	+	+	6	+			+						2
Books	-			+						1					+					1
Novels			+		-				+	2		+					+			2
Information		+				+				2										
Computer manual																+				1
Mail, bills, etc.	+					+				2	-									
Work related												+								1

[a] "...waste of time to sit and read a book."

On further questioning, the latter two did indicate that they read a newspaper and occasionally read magazines.

These responses and comments may have reflected participants' attitude towards reading. Smith (1990) defined reading attitude as "a state of mind, accompanied by feelings and emotions, that make reading more or less probable" (p. 116). In his study, Smith found a strong relationship between attitude and reading behaviour. He reported that adults who enjoy reading take time to do it, while those who find it unenjoyable tend to avoid it or to read only what they have to. If the converse is true, participants' responses about outside of work reading may reflect an attitude that lessens the possibilities of their reading.

It may be of note that none of the higher rated reader participants said that they do not read outside of work. Further, although the majority of these participants reported that they read very little outside of work, three of them commented that they did not have time to read due to the nature of their work schedules. On the other hand, two of the lower rated reader participants' initial answers about outside of work reading were "no," and while a number of lower rated reader participants also reported reading very little, none of them commented about a lack of time for reading (although one did say that he should make time). These differences in responses may suggest that some lower rated reader participants did not view themselves as readers.

Beliefs about Reasons for Differing Reading Ability

I asked participants for their views regarding why people may be more able or less able readers (see Table 4.4). They mentioned educational background, practice, interest, and individual nature to explain differences in reading ability.

Table 4.4

Beliefs about Reasons for Differing Reading Ability

	HIGHER RATED READERS									#	LOWER RATED READERS								#
	I				II						I			II					
	20	21	23	24	1	2	3	4	8	9	6	11	19	5	13	14	15	18	8
Educational Bckg.																			
More able			+				+			2	+		+	+				+	4
Less able	+	+	+	+	+			+	+	7	+	+	+	+		+	+	+	7
Practice																			
More able	+	+		+		+				4	+	+	+					+	4
Less able	+						+	+		3		+							1
Language/vocab.[a]																			
More able											+		+					+	3
Less able			+							1									
Motivation/attitud																			
Interest																			
More able	+	+		+		+	+			5	+								1
Less able						+	+			2	+								1
Nature (the way people are)																			
More able																+			1
Less able															+				1
Learning disab/ Slower learner																+			1
Less able	+						+			2					+	+			2

[a] English is a first, rather than an additional language (21, 18), or reader has more developed vocabulary, through higher education (6, 19).

Educational Background and Practice

The majority of participants in both groups suggested limited education as a reason for people being less able readers: "left school and concentrated on the practical side" (11); "never had the chance to get the proper education" (13); "maybe never finished high school" (20). A number commented that people had to leave school in order to work and contribute to the family income.

Education was also reported as a factor in becoming a more able reader, but was mentioned less frequently. Comments about more able readers included "having grade 12" (5), taking "reading courses or something in university to make them better" (3), and going to "college or university" (19). Lower rated reader participants were more likely than higher rated reader ones to mention education in this regard.

Participants' beliefs about education reflect those of the Canadian public; in a survey about literacy, the majority of respondents considered education to be the main factor in literacy development (Decima, 1990). However, they do not entirely reflect participants' own educational experiences (see Table 4.5). Those who mentioned education as a factor in becoming a more able reader had completed between grade 6 and high school. Participants with university education did not mention education as a factor in becoming a more able reader.

Table 4.5

Beliefs about Education as a Factor in Reading Ability Compared to Educational Background

	HIGHER RATED READERS								#	LOWER RATED READERS							#
	I				II					I			II				
	20	21	23	24	1	3	4	8	8	6	11	19	5	14	15	18	7
Education as a factor in ability																	
More able			+			+			2	+		+	+			+	4
Less able	+	+	+	+	+		+	+	7	+	+	+	+	+	+	+	7
Participants' education[a]	HS	U	HS T	U	T	11 T	11 T	9		10	10 T	-HS	7 AU		T	6 T	

[a] HS= High School; Numbers= grade completed; U= University; T= Trades program; AU= Academic Upgrading.

Practice, or lack of practice, was mentioned as a factor in reading ability by both higher rated and lower rated reader participants. However, participants in both groups were more likely to name practice as a reason for becoming an able reader than they were to mention lack of practice as a cause of lower reading ability. Views about practice may be reflected in the comments of a lower rated reader participant who said he should make time to read, and of two lower rated reader participants who said they now read more books than they did before.

I did not ask participants to elaborate about what they meant by practice or about when and how practice might occur. However, a review of participants' reported outside-of-work reading does not show a relationship between their reading habits and their views about the role of practice (see Table 4.6). Five of the higher rated reader participants who mentioned practice as a factor had reported that they did not read very much. Only one higher rated and one lower rated reader participant who mentioned practice as a factor had said that they read outside of work. The lower rated reader participant, in fact, reported that he was now making time to read. It may be that the higher rated reader participants had had more practice in school, since they generally had completed more schooling than the lower rated ones. Incidently, two higher rated readers with less schooling (2, 9) had described how at one time they had done a considerable amount of reading.

Table 4.6

Beliefs about Practice as a Factor in Ability Compared with Reported Outside of Work Reading

	HIGHER RATED READERS						#	LOWER RATED READERS									#
	I			II				I				II					
	20	21	24	2	3	4	6	6	11		19					18	4
Practice as a factor in ability																	
More able	+	+	+	+			4	+	+		+					+	4
Less able	+				+	+	3		+								1
Reading outside of work																	
Yes			+		+		2		+			+		+			3
No				+			1	+			+						2
Not much/very lit	+	+		+		+	4						+				1
The newspaper										+					+		2

Motivation, Attitude, and Interest

As shown in Table 4.4., higher rated reader participants were much more likely than lower rated ones to mention motivation, attitude or interest as a factor in reading ability. Their responses reflected views about interest in their work as well as in the content of what had to be read. Comments included: "interest in what I'm reading, interest in my job (2); and "interest in what is going on, broad interest" (24).

Individual Nature

Two higher rated and two lower rated reader participants suggested that reading ability was inherent. The higher rated reader participants referred to a learning disability or slow learning as a possible explanation for being a less able reader. One lower rated reader participant suggested that more able readers are "a little smarter. [They] have something that someone else don't have, that's all" (14). Another lower rated reader participant suggested that to become a more able reader himself, he would need to "change my brain" (13).

Generalizations: Beliefs about Reading

To elicit information regarding beliefs about the reading process, I asked participants what they thought a person would need to learn in order to become a more able reader. This line of questioning was not particularly fruitful; some people either said they didn't know, or seemed to "guess" at answers, and some seemed to be trying to recall how they had learned to read, which can be a difficult process (Garner, 1987). However, participants' responses regarding self-rating of reading ability, about outside of work reading, and about the need for reading ability in this workplace, did suggest some beliefs about the reading process. I also asked participants to discuss some news items, to find out about their beliefs about literacy as a means to be informed. This related to a larger issue regarding beliefs about literacy and participation.

Beliefs about the Reading Process

Pace of reading and a distinction between "reading" and comprehension were the most frequently mentioned reading-related concepts (see Table 4.7). For instance, when asked how he rated himself as a reader, a participant answered, "are you talking how fast you read, comprehending, or just reading, or what?" (21).

Pace was mentioned as a factor in reading by both higher rated and lower rated reader participants. Comments about pace included: "I'm not a speed reader, but probably more so than others" (20), and "I'm not a fast reader, but not a slow reader" (2). As well, three participants in each group mentioned that they read slowly or slower than others.

None of the participants who used pace as a criterion for self-rating mentioned that they vary their pace according to the demands of the task. Viewed alone, their responses may suggest that they saw pace of reading as arbitrary. However, some participants compared their pace of reading to others completing the same task. For instance, one explained that when reading during a course, he "might be the fifth to go for coffee" (2) as some finished reading before him and others finished after. As well, in another part of the interview, some participants did mention "reading more slowly" as a repair strategy. Further, during the reading activities part of the interview, I observed participants varying their pace according to text difficulty.

Table 4.7

Beliefs about the Reading Process

	HIGHER RATED READERS								#	LOWER RATED READERS									#
	I			II						I				II					
	20	21	24	1	2	3	4	8	8	6	11	16	19	5	13	14	15	18	9
Concepts																			
Pace of reading	+	+	+		+	+		+	6	+	+	+	+			+	+		6
Read/understand	+	+	+	+	+	+		+	7	+					+		+		3
Read/retain										+						+	+		3
Pronouncing words														+				+	2
Strategies			+				+		2				+				+		2
Influences																			
Reading aloud											+			+	+		+	+	5
Knowledge/interest								+	1			+							1
Related factors																			
Writing ability								+	1		+					+			2

Some participants mentioned pace in relation to comprehension. One emphasized that "I would always understand it but it would take me a bit longer to read it" (2). Another described how "others flip through pages and get information. For me it might take three or four minutes to read that much, to retain that much" (21). A third said that he was "on a par with regards to reading, but absorbing, that's different...takes longer to sink in" (14).

The participant who suggested that he took longer than others to "absorb" what he read, also distinguished between "absorbing" and "reading." This distinction was mentioned by other participants, most frequently by higher rated reader ones. Seven higher rated reader participants distinguished between reading and comprehension, while three lower rated reader participants did. Other comments included: "I can read and not understand it. If I'm reading in electronics [I] can read the words but not understand what it means" (8); and, "more important than ever that people learn to read and learn to know what they read" (20). While the distinction between "reading" and comprehension suggests a meaning-oriented view of reading, it also reflects a view that "reading the words" can be a separate process from "reading to comprehend."

While fewer lower rated than higher rated reader participants mentioned comprehension in their responses, five in the lower rated reader group mentioned reading aloud as issues in reading and two of these referred to pronunciation. One noted that the only problem he had was reading in front of people (15). Another suggested that listeners would have difficulty understanding him when he read aloud because he "spurts, sputters and stammers" (12).

A concern with oral reading could be interpreted as reflecting a word-oriented view of reading (Gambrell & Heathington, 1981; Smith, 1990). However, participants' responses seemed to reflect an awareness of actual difficulties. Reading aloud is a common task for supervisors and discomfort with the task could make participants aware of it. Further, lower rated reader participants' responses to later questions about task and strategy suggested that they do attend to meaning and understand factors which influence comprehension. Their responses in this regard were similar to those of higher rated reader participants. Thus, while higher rated reader participants' tended to emphasize comprehension, and lower rated ones were concerned with reading aloud, these differing responses may not indicate differing beliefs about reading as meaning oriented or word oriented.

Beliefs about What Counts as Reading

When talking about outside of work reading, I asked participants to indicate the items they read (see Table 4.3). From their responses, it seems that some participants perceive "reading" as "reading books"; lower rated reader participants may have been somewhat more likely than higher rated ones to have this perception.

Two lower rated reader participants had said that they did not read outside of work. When questioned, however, they reported that they did read a newspaper and magazines. In response to another question, one of these participants described an "excellent" reader as one who could "pick up a pocket book and read the whole thing and understand what's in it" (6). Further, the lower rated reader participants who answered yes about outside of work reading were the only ones in this group who said that they read books regularly.

In contrast, two of the higher rated reader participants who answered yes about outside of work reading said they read books, but the other one who answered "yes" about outside-of-work reading did not report reading books. Two of the higher rated reader participants who said they read very little specifically noted that they do not read books, but others who reported little reading did include books in their inventory of items read.

Differences in views about what counts as reading also may have been reflected in participants' reported magazine reading.[2] Six higher rated reader participants volunteered that they read magazines. Two lower rated reader participants reported that they read magazines, but only after I specifically asked about this. This may suggest that higher rated reader participants saw reading as having wider purposes than did lower rated readers.

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[2] Magazine reading tended to be related to recreational interest (golf, automobiles and sports), although one higher rated reader participant reported that he read "all kinds of magazines" (3).

Beliefs about Literacy for Participation

As discussed in chapter 2, there is a tradition of viewing literacy as a requirement for citizenship and social participation. I was interested in whether participants' reading practices suggested that they shared this view. To address this, I used newspaper reading and interest in news events to gauge and compare participants' awareness of current issues. I generally found little difference in awareness or interest in current issues between higher rated and lower rated reader participants. In fact, it was two of the lower rated readers who seemed to be particularly avid about attending to the news.

As shown in Table 4.8, all but one higher rated and one lower rated reader participant reported that he read a daily newspaper. (This is consistent with findings of other studies about adults' reading habits [Kirsch & Guthrie, 1984; Smith, 1990].) Six higher rated and eight lower rated reader participants reported that they followed the news on television. While the majority (13) of participants reported reading a local paper, the higher rated reader participants were more likely to read one or two other papers as well. The choice of local paper was reflected in seven participants' interest in local news; three participants volunteered an interest in world news, and one a concern with national events.

Table 4.8

Keeping Informed about the News

	HIGHER RATED READERS									#	LOWER RATED READERS									#
Yes: + No: -	I				II						I				II					
	20	21	23	24	1	2	3	4	8	9	6	11	16	19	5	13	14	15	18	9
Do you read a Newspaper?	+	+	+	+	+	-	+	+	+	+ 8	+	+	+	+	+	-	+	+	+	+ 8
What newspaper(s)?																				
Local	+	+		+	+		+	+	+	7	+	+		+	+		+	+		6
Edmonton Sun			+		+			+	+	4					+					1
Edmonton Journal			+	+	+		+		+	5		+		+						2
Globe and Mail				+						1		+								1
News Interests																				
Local	+	+	+		+					4	+	+	+							3
National														+						1
World					+					1	-	+			+					2
Current affairs							+	+	+	3							+	+	+	3
Sports	+				+			+	-	3							+	+	+	3
Editorial	+						+			2										
Do you follow news on TV?	+	-			+	+	+	+	+	6	+	+	+	+	+	-	+	+	+	8
regularly	+				+		+	+		(4)	+	+			+			+	+	(5)
sometimes						+			+	(2)			+							(1)
on radio?		-	+					+		2						+		+		2
Why do you follow the news?																				
Keep informed															+		+			2
Conversations	+									1					+					1

To gauge more specific interest and awareness of current events, I asked participants to review a selection of news headings from several issues of an Alberta daily paper; the headings reflected then current national and international events and issues, including the prison release of Nelson Mandela, the Goods and Services Tax, the Meech Lake Accord, French language rights, and the Liberal Party leadership election (see Table 4.9 and Appendix B). I asked participants which headings they would choose to read about, about the basis for their selections, and about what they knew regarding the topics they hadn't selected. I drew inferences from their responses about interest and awareness of prominent events and issues.

As Table 4.9 shows, more higher rated reader participants reported an interest in some of the news topics than did lower rated ones (e.g., "Hungarian Minister; Meech Bakers). However a similar number of participants in each group reported an interest in a number of topics. Further, the apparently most avid news followers were lower rated reader participants. One of these men reported reading the Globe and Mail, the Edmonton Journal, and a local paper, and the other reported reading the Journal and the Sun as well as watching TV news and a daily national TV news program. This participant said he kept up on news in order to start conversations on topical issues and learn about them.[3]

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[3] Of all of the participants, this particular person (5) had the most difficulty completing some of the reading activities in the second part of the interview. In other words, he was the least able reader in relation to these tasks.

Table 4.9

Interest in News Events

	HIGHER RATED READERS									#	LOWER RATED READERS									#
	I				II						I				II					
Yes: + No: -	20	21	23	24	1	2	3	4	8	9	6	11	16	19	5	13	14	15	18	9
Mandela[a]	+		-	+	+	+	+	-	-	5		+		+	+	-	-	+		4
Awareness[b]	+	+			+			+		4	-			+		+	+			3
Opinion/views[c]						+	+			2		+						+		2
Hungarian Minister		+		+	+	+	-		-	4	-	+			-					1
Awareness		+	-		+	+				2		+								1
Opinion/views																				
Meech Backers	+	+	-	+	-	+	+	-	-	5				-	+		-			1
Awareness	+	-						+		2		+								1
Opinion/views			+	+	+	+	+			5				+						1
Canada's UI reform	+	+	-			-	-	+		3		+							+	2
Awareness												+								1
Opinion/views		+				+		+		3										
Cripling Cod Crisis	+	+			+	+	+		+	6		+		+	+	+		+	+	6
Awareness			+		-	+			+	3									+	1
Opinion/views	+	+					+			3							+	+		2
Axworthy/Chretien	+	-		-		+	-		+	3					+		+			2
Awareness	+									1		+								1
Opinion/views						+			+	2		+			+		+			3
Reform Party		+		-		+	+		-	3		+				-				1
Awareness		+			+					2						+				1
Opinion/views						+	+			2		+								1
GST/Overspending	+	+			-	-	+		+	4	+	+	-	-	+	-	-	+	+	5
Awareness	+		+							2		-								
Opinion/views		+		+	+		+		+	5					+			+		2
Thunder Bay Votes	+	-					+		+	3	+	-		+	+			+		4
Awareness	-										+			+						2
Opinion/views			+		+	+	+		+	5		+					+	+		3
Joyful Crowds					+	-	-	+	-	2		+							+	2
Awareness		+	+			-		+		3		+							+	2
Opinion/views																				

[a] Articles which participants said they would likely read are designated "yes" (+).
Articles they said they would not likely read are designated "no" (-).
[b] Participant was aware of the topic of the article (e.g.,Mandela is a South African
[c] Participant expressed views/opinions or information in addition to that which indicated awareness.

Levine (1986) argues that participatory and political consequences of literacy are highly dependent on a number of factors. In other words, literacy can enable awareness and understanding of current issues, but these are not automatic outcomes of reading ability. Participants' responses support Levine's view. For instance, two higher rated and two lower rated reader participants commented that they "don't usually read political stuff" (16). Although some participants in both groups commented that they had been following and trying to understand GST issue, others commented that there wasn't a "heck of a lot we can do" (13) about it.

Metacognitive Knowledge: Task

Flavell (1979) described the task category of metacognitive knowledge as including one's knowledge of the information available to complete a task, and knowledge about the demands or goals of the task. Regarding the first subcategory, I asked participants to explain what makes some texts more difficult to read than others. As well, during the reading activities part of the study, I asked participants to comment about who might find a particular text difficult to read, and to compare two texts and explain why one was more difficult. Regarding the second subcategory, I asked questions about goals and demands for reading, including the general purposes for paperwork in their workplace, and requirements for reading ability in the company. I also asked about participants' roles as supervisors in relation to these demands.

Sources of Difficulty in Text

As shown in Table 4.10, participants mentioned vocabulary, topic familiarity, interest, structure and writing as sources of difficulty.

Unfamiliar vocabulary was the most frequently mentioned source of difficulty in a text: "if it's got a ten dollar word in there "(23); or, "some words I don't understand" (18). Some participants mentioned difficulties with specialized vocabulary: "a lot of words from these engineer guys" (3); "like a contract...words are not layman's terms (14). Given that several participants said they didn't often

Table 4.10

Sources of Difficulty in Text

	HIGHER RATED READERS									#	LOWER RATED READERS									#
	I				II						I				II					
	20	21	23	24	1	2	3	4	8	9	6	11	16	19	5	13	14	15	18	9
Unknown vocabulary	+	+	+		+		+		+	6			+		+	+	+		+	5
Unfamiliar topic				+	+	+		+	+	5	+			+	+	+	+			5
Insufficient info.									+	1										
Not interesting	+	+						+	+	4					+			+		2
Not relevant												+						+		2
Language structure					+		+			2		+			+	+				3
Way it is written													+							1
Length											+									1
Poorly written				+	+		+			3										
No headings												+								1
Not taking time to read						+				1										
Misinterpreting					+					1										
Interruptions								+		1										

encounter difficult text, and since there is a good deal of familiarity in what they read, vocabulary may be the most obvious and most easily articulated source of difficulty.

A number of both higher rated and lower rated reader participants cited unfamiliar topics as a possible problem: "something to do with something I haven't been involved in" (24), or "something that's happening at the other end of the plant" (13). Participants also mentioned how topic knowledge makes some texts easier to read. One participant explained that he doesn't encounter much that's difficult, because, he said, "I've done most of the work before...[it's] pretty familiar" (6). Another made a similar comment: "If I understand what I'm reading, or having been in that situation before, I understand faster" (14).

Participants' views about the role of background knowledge in reading were also confirmed as they worked on the first of the three reading activities I asked them to complete. When asked about who might have difficulty understanding the procedure they were reading, participants consistently suggested that people who were unfamiliar with the procedure would. In the course of reading, participants also commented about their own knowledge or lack of knowledge regarding the procedure.

These responses suggest that higher and lower rated reader participants had similar views about the role of background knowledge in reading. Related to background knowledge, higher rated and lower rated reader participants were equally likely to mention interest (including relevance) as a factor. Thus, while participants' earlier responses regarding beliefs about reading suggested that lower rated reader participants were less likely than higher rated ones to hold a meaning-based view of reading, their discussion about factors influencing task difficulty suggest that higher rated and lower rated reader participants hold similar views about comprehension.

Some participants referred to the "way it is written" (1) as a source of problems. In some instances they seemed to be talking about structure, for example, in reference to "heavy corporate policy" a participant talked about having to "look for the 'the' and the 'there' and the 'where'" (1).

Higher rated reader participants were more likely to blame the writer by suggesting that a text might be poorly written: "Generally it's the person who writes it" (3); "Some people can't write" (24). Three higher rated reader participants made this suggestion, while none of the lower rated readers did. Perhaps the higher rated reader participants had more confidence in finding fault in the text.

Participants made more suggestions about sources of difficulty during the third reading activity, when I asked them to compare the Alberta Occupational Health and Safety Act with an easier to read overview called An Employer's

Guide to the Occupational Health and Safety Act. (Excerpts from both documents are reproduced in Appendix B.) I asked for general reactions to the document, comments about the readability of each, and examples of situations in which participants might use each one.

All participants provided similar assessments regarding the relative ease and difficulty of the two texts, and suggested similar purposes for using each one. However, the higher rated reader participants tended to be more specific in their comparisons, and were more likely to refer to the particular way in which the Act was organized (sections, sub-sections, etc.). While the higher rated reader participants acknowledged that the Act would be more difficult to read than the Guide, they did not state any lack of confidence in being able to read it. A number of lower rated reader participants, on the other hand, stated that they would have difficulty or be unable to find and understand information in the Act.

Purposes for Reading at Work

Background: Reading at Work

To develop my background knowledge about the general nature of participants' workplace reading tasks, I asked them to name items they have to read as part of their work and to estimate the time they spent reading at work. As shown in Table 4.11, correspondence, and form and document-type materials were identified most frequently by both higher rated and lower rated reader participants. Procedures (written instructions for completing specific tasks) were also mentioned relatively frequently by the higher rated reader participants, but not by supervisors in the lower rated reader group. However, participants in the latter group confirmed their use of procedures when they were presented with a set in the first reading activity.

Table 4.11

Texts Read at Work

	HIGHER RATED READERS									#	LOWER RATED READERS									#
	I				II						I				II					
	20	21	23	24	1	2	3	4	8	9	6	11	16	19	5	13	14	15	18	9
Correspondence				+						1										
Memos	+	+		+	+	+	+	+	+	8	+	+		+	+	+		+		6
Safety memos			+		+		+	+	+	5	+		+							2
Forms/documents				+						1										
Time sheets			+							1				+		+	+			3
Daily progress/ passover sheets			+				+	+		3			+		+	+	+		+	5
Daily assignment/ schedules			+							1						+			+	2
Work orders	+						+	+	+	4	+						+			2
Loss management						+				1	+									1
References																				
Manuals/parts bks.			+	+			+			3			+					+	+	3
Procedures	+		+			+	+	+	+	6				+	+		+			3
Equipment updates					+					1						+		+		2
Supervision																				
Team meetings												+		+	+					3
Minutes						+				1										
Theme of the month						+	+			2				+	+					2
Appraisals											+				+					2
Other																				
Contracts		+								1										
Reports	+									1				+						1
Budgets		+								1										
LMP course		+								1										
Sales literature				+						1										
Newsletters			+						+	2								+		1

The responses conformed to those given in an earlier investigation of reading requirements carried out in this same workplace.[4] These responses demonstrate a diversity in the kinds of texts workers read, consistent with the findings of other investigations of adult reading (Kirsch & Guthrie, 1984; Smith, 1990).

Regarding time spent on reading (Table 4.12), participants estimated that they spent from half an hour to two-to-three hours in daily reading at work, with most participants reporting between one and two hours. Although these times are considered estimates--several participants noted it was difficult to say--they are consistent with findings of other studies about adults' reading habits (Kirsch & Guthrie, 1984; Smith, 1990).

A comparison of reading times for the two groups shows that the lower rated reader participants generally reported more time spent reading in a day than did the higher rated ones. Among the lower rated reader participants, three said they spend two hours reading, and two reported two-to-three hours. Four of the higher rated reader participants reported reading for one hour, one reported one to one-and-a-half hours, and two reported reading for two hours. Given that the participants have generally similar reading requirements, and similar supervisory experience[5], the

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[4] In an earlier investigation related to developing a reading program, six supervisors were interviewed specifically about their on-the-job reading requirements. They were asked to list, as completely as possible, the texts they encountered, to rate the importance of each to their work, and to estimate the daily time spent reading each.

Table 4.12

Time Spent on Reading at Work

	HIGHER RATED READERS									#	LOWER RATED READERS								#
	I				II						I				II				
	2	21	23	24	1	2	3	4	8	8	6	11	16	19	13	14	15	18	6
Hours per day																			
2-3																+	+		2
2	+			+						2			+		+			+	3
1-1.5			+							1									
1		+			+	+			+	4									
.5-1								+		1									
.5														+					1
Comments: amount																			
Do a lot now												+							1
A lot of memos	+									1	+			+					2
Not too many memos													+						1
Nothing regular						+				1									2
Not a lot to read							+	+	+	3			+		+	+			3
Mostly verbal																			
Less time than I'd like to	+																		
Comments: Process																			
As it comes along/ When I have time			+		+		+			3					+				1
Read on the bus													+						1
Need to spend time in the field									+	1									

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[5] In a study of literacy with electronics technicians, Mickuleky and Ehlinger (1986) found that novice technicians spent considerably more time referring to print on the job than did their more seasoned counterparts who were able to recall procedures from experience. In this study, one of the more proficient reader participants (2) noted that when he had been transferred as a supervisor from one department to another he had initially spent considerable time reading manuals, procedures, and the like in order to become familiar with the trade.

difference in time estimates may suggest that the higher rated reader participants are able to deal with their reading more quickly. Time estimates need to be verified before conclusions could be made.

Responses about time spent reading at work do not show a relationship between reported time and participants' earlier discussed views about the role of practice in becoming a more able reader. The higher rated readers tended to read for a shorter amount of time per day than the lower rated ones. Again, questions about what is meant by practice may be in order, along with more indepth investigations of how reading time is spent at work.

Purposes for Paperwork

Participants provided numerous responses about purposes for paperwork, which I grouped in three categories: informing, history, and organization (see Table 4.13). Informing and history-type purposes were mentioned with almost equal frequency by both groups, but higher rated reader participants were somewhat more inclined to mention organization-type purposes. As will be discussed, participants' comments suggest that the last category is actually a broader view: Communication and record keeping are needed to maintain the organization.

Table 4.13

Purposes for Paperwork

	HIGHER RATED READERS									#	LOWER RATED READERS									#
	I				II						I				II					
	20	21	23	24	1	2	3	4	8	9	6	11	16	19	5	13	14	15	18	9
Informing																				
Keeping informed	+			+		+	+	+		5	+	+		+		+	+		+	6
Communication	+	+			+	+	+	+	+	7	+	+	+	+		+	+	+	+	8
Safety (specific)				+	+	+		+	+	5			+	+			+			3
										17										17
History				+			+	+		3		+								1
Documentation	+	+	+	+	+	+	+	+		8	+	+		+		+	+	+		6
Planning [a]	+		+	+		+	+	+		6		+	+		+	+		+		5
Reference/reminder			+				+			2	+	+	+	+		+				5
										19										17
Organization																				
Safety(Philosophy)	+		+	+				+		4	+				+					2
Manage/Production	+				+		+	+		4	+	+			+					3
Team Management					+					1				+	+					2
Loss control			+	+			+	+	+	5	+			+	+		+			4
Training								+		1										
										15										11

[a] Planning for equipment replacement, repairs, etc.

Informing. Within the informing category, both higher rated and lower rated reader participants used the term communication to answer questions about purposes, for example, "I guess the main purpose would be communication" (20). In giving this response, participants were referring to communication between various areas of the industry, between management and occupational staff, and between one team of workers and another. In some cases, participants emphasized the importance of communicating safety information, such as details about an accident and how to avoid similar occurrences. As well, a number of participants in each group specified a need to keep generally informed:

> to give you a broad idea of all that is going on around you, to keep you informed, keep you very active, you know what you're talking about (11).

History. Some participants specifically named "history" as a purpose for paperwork, and these and others gave reasons for the importance of record keeping. A variety of forms and memos are used to keep track of work completed and time spent on a task, including time sheets and passover sheets. As well, information may be recorded to document that a particular meeting took place, or to explain a particular situation:

> When you're looking after contractors and someone comes back and says what work did you do on this day and how come it took so long, because they're looking at a time sheet that I signed.... I'll look and say, yes that does seem that those hours are too high, but at the time I won't be able to remember, and I'll have to think about it for awhile instead of being able to look back through my diary and saying...there it is (21).

A number of participants also commented on the need to keep records for planning purposes. Individual supervisors "...keep records [and] go back...to find out what went wrong or what did you do last time that this happened" (11). As well, planning departments in the company use information to track, for instance, the cost effectiveness of equipment use: "What they want to know I guess is to get the big picture...do we need this piece of equipment?" (2). Some supervisors commented on the reference purposes of reading, in the diaries they keep or memos they post, or in the manuals they refer to:

> You've got to have records of some things to refer back to.... Service manuals...you read them once and you forget em because they're very dull, you read them when you're doing the job to know how (13).

Lower rated reader participants were more likely to cite a reference/reminder type purpose than higher rated reader participants (four and two participants, respectively). However, two of the higher rated reader participants had referred to the fact of keeping a diary (one demonstrated his electronic diary in the interview) but did not mention reference/reminder as a purpose.

Organization. Some participants in both the higher rated and lower rated reader participant groups volunteered responses about the organizational purposes of paperwork:

> There's just more stewardship, you have to inform people, the area's gotten bigger, there's more focus on safety. This loss management style of managing that we're doing now, communication is a big thing (4).

Others who initially volunteered answers regarding informing or history-type purposes were asked further questions, such as "why is communication important?" In responding, some gave additional broader, organization related answers:

> Again some of it is just because of the company's philosophy and the team management.... It's a team concept of management.... There must be more communication than the old style of management.... A lot of information is passed right on down the line to the occupational level, where another company it wouldn't be like that (1).

Overall, seven of the higher rated reader participants gave organization-related responses compared with four of the lower rated reader participants. Given the sameness of participants' responses regarding the other two categories of purposes, this difference may be notable. Perhaps higher rated reader participants were more likely to have a broad understanding about organizational uses of paperwork.

The Need for Reading Ability at Work

I asked participants whether it was necessary to be an able reader to be a supervisor in their company, and whether occupationals[6] needed to be able to read (see Table 4.14).

All of the 11 participants who responded to the first question indicated that one has to be able to read to be a supervisor. Two in each group noted that reading ability was needed more than ever and some noted that it was becoming particularly necessary with computerization, ongoing employee training, and changes in management styles--"managing people rather than equipment" (1). These views related to the general views about literacy and the changing economy which were described in chapter 1. One participant also noted that the company is able to hire employees with higher levels of education than previously.[7]

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[6] "Occupational" refers to frontline workers.

[7] The company receives several thousand job applications a year.

Table 4.14

The Need for Reading Ability at Work

	HIGHER RATED READERS							#	LOWER RATED READERS						#
	I				II				I			II			
	20	21	23	24	1	4	8	7	6	16	19	13	14	18	5
Supervisor															
Yes	+	+		+	+	+	+	7	+		+	+	+	+	5
More than before	+						+	2			+	+			2
Reasons															
Computerization	+			+				2						+	1
Read/understand	+	+				+		3	+						
So much paperwork									+						1
Management system	+							1						+	1
People management					+	+		2				+			1
Training						+		1				+			1
		21	23	24		4	8	5	11	16	19	13	14	18	6
Occupational															
Yes				+		+	+	3	+	+	+	+	+	+	6
More than before									+			+			2
Can get by without		+	+	+		+		4		+	+		+		3
Reasons:Yes															
Standards															
Written procedures									+						1
Computers				+				1							
Keep up w. change						+	+	2							
Training						+		1							
Reasons:No															
Know the job						+		1		+			+		2
Few requirements for reading		+						1			+				1
Supervisors help			+	+		+		3							

The lower rated reader participants were more likely than the higher rated ones to say that occupational workers needed to be able readers. However, several agreed with the higher rated reader participants that an occupational worker could manage without being able to read. Some participants suggested that occupationals' work didn't require reading or that occupationals could get help with reading as needed.

These views are consistent with earlier reports about workplace reading (Diehl & Mikulecky, 1980).

Some participants said that they knew or had known occupational workers who could not read or who had reading difficulties. When asked about how workers with reading difficulties coped on the job, the responses from both the higher and lower rated reader participants suggested a high degree of willingness to accommodate workers with reading difficulties; the most frequent response was that "people help each other out" (23). One participant, who currently supervised a worker who could not read, reported that he or another supervisor sat in on any written tests which this worker had to take. Others talked about "coaching" (8) or using "verbal communication" (21). Only one response reflected a less positive view: "As a supervisor, he's sort of standing over the guy [with reading difficulty] as he's doing his job..."(24). A number of participants volunteered that workers with reading difficulties are "good workers"(4) or are "hard to beat"(8) on the job. No one suggested that workers with reading difficulties are a liability, in contrast to much of what is cited in current reports (Canadian Business Task Force on Literacy, 1990; Perrin, 1991). Participants' comments may have reflected a view that being able to read well is an asset, but is not a primary criterion for measuring people's worth in the workplace.

Role of Supervisors

Within the context of discussing purposes for paperwork, I asked some participants about their roles as supervisors. Information was a key word in the responses of those who discussed this topic: "I'm the immediate source of information to my guys" (11); "He's got to make sure that everybody's got that source of information" (6). Related to the informational aspects of the supervisors' roles, some participants commented that they are a "main link between the management and the occupational" (1) and that "I have to try to get [the information] down to where everyone understands what we're talking about, and leave out all those fancy terms" (1). These responses related to their comments about sources of difficulty in text.

Metacognitive Knowledge: Strategies

Flavell (1979) defines strategies as behaviours used to accomplish cognitive or metacognitive goals. Metacognitive knowledge of strategies includes knowledge about what strategies are likely to be effective in accomplishing goals. In this regard, I asked participants questions about how they dealt with incoming paper at work and how they transmitted printed information to the occupational workers they supervised. I also asked about how they dealt with unknown vocabulary and with passages that they do not understand. I inferred concepts about strategy use from their responses. As well, additional information about participants' strategy knowledge emerged from discussion about the time they spend on reading, and from their comments on the reading course.

Dealing with Paperwork

When estimating the time they spend on reading, some participants commented that they read "as it comes along" (see Table 4.12). To gather more specific information, I asked participants to suppose that they had just resumed work after a week or two off, and to describe how they would deal with the mail which had accumulated in their absence. Participants in both groups reported similar strategies (see Table 4.15) and it appears that all the participants are aware of strategies for efficiently dealing with an accumulation of mail. Participants either said that they sorted the mail by topic and/or importance, or that they looked through and pulled out items which needed attention:

> I'll go through everything and sort it into piles.... Piles I've got to do something with, fill in or something. Another pile is what I've got to throw away. Other piles...loss control, safety presentations.... (24)

> Basically I flip through it real quick. If I have 15 pieces of paper I just stand them up and start from the back, lay it down, lay the next down... Looking for things I need to deal with and for things I can throw back in the basket.... (4)

Participants' responses reflected beliefs about supervisors' requirements to know what to look for, and to make judgements about what is important; a number, for instance said that they look for safety concerns. This is consistent with studies such as those carried out by Mikulecky and colleagues (1983, 1986). When describing how they approached each item, participants in both groups reported some sort of scanning strategy: "just glance through it" (6); "I start by skimming (15); "You quickly scan it" (24).

Table 4.15

Dealing with Paperwork

	HIGHER RATED READERS									#	LOWER RATED READERS								#
	I				II						I				II				
	20	21	23	24	1	2	3	4	8	9	6	11	16	19	5	13	15	18	8
Sort	+		+	+	+	+				5	+	+				+			3
by topic				+		+				2		+							1
by importance	+			+	+					3	+	+				+			3
Look for items needing attention/ that are important		+				+	+	+	+	5			+	+	+		+	+	5
Scan, skim, glance	+			+	+	+		+	+	6	+		+			+	+	+	5
Note req. action	+	+		+						3									
Deal with items of importance, come back to others	+	+		+		+		+	+	6						+	+	+	3

Informing Others

Participants in both groups reported using similar strategies for transmitting information to the workers they supervised. For the most part, participants varied their strategies, depending upon the text and the situation.

Some participants in both groups shared the complete text, either by presenting an overhead transparency copy, or by distributing photocopies. These participants said they might comment on important points in these copies, but they also mentioned reading the entire passage if it was important: "If it's about an incident it's better to take the full memo down and read it.... That makes sure there's a gospel in it, that it's the truth" (19); "If it's a safety item I'll read it word for word" (2); [for some] you have to read it right through to make sure they understand" (15); "Mostly we read the whole thing because then everybody gets it straight" (18).

There was slightly more inclination on the part of lower rated reader participants to read out the entire memo so that people "got it straight," although higher rated reader participants would also read an entire memo if it were important, depending on the length. Perhaps lower rated reader participants had a more text-bound view of meaning (the meaning is in the text), or they may not have trusted their abilities to summarize or interpret information.

As well, lower rated reader participants' responses may have reflected habits of attending equally to ideas in a passage. When I asked the lower rated reader participants about what they had learned in a reading course they had taken, almost all of them mentioned learning to identify the main idea of a passage. Comments included: "I'm able to pick out in one or two sentences what they're trying to say" (6); "That's what I'm...doing now. I'll scan through the memo and get the main points...I knew about it [but] I became better at it" (19).

Responses were not surprising, since strategies for identifying main ideas had been a major component of the course. Responses also suggest that some of the lower rated readers had not readily picked out main ideas prior to taking the course.

Repair Strategies

Unknown Vocabulary

I asked participants what they did when they were reading if they encountered unknown words. As shown in Table 4.16, the majority of both higher rated and lower rated reader participants reported that they use a dictionary or infer meaning from context. However, while all the higher rated reader participants mentioned both strategies, not all lower rated reader participants did.

Although most participants mentioned using context, higher rated reader participants tended to mention dictionary use first. Half of the lower rated reader participants' also gave dictionary use as a first response. As one participant noted, "guessing" doesn't always work. It may be that use of context is so automatic for participants that they are not as aware of employing that strategy, although it was evident that some did use context while completing reading activities. Dictionary use may have stood out because it requires a more deliberate effort and might be used for words that pose particular difficulty.

Table 4.16

Repair Strategies: Unknown Vocabulary

	HIGHER RATED READERS									#	LOWER RATED READERS								#
	I				II						I				II				
	20	21	23	24	1	2	3	4	8	9	6	11	16	19	5	13	14	15	8
Consult dictionary	1[a]	1	1	2	1	1	2	1	1	9	2	1	No[b]	2		1	1	1	6
Use context	2	2	2	1	3	2	4	2	4	9	1	2		1	4	2	2		6
Ask someone					2		1		2	3									
Omit it/don't worry							3			1			1		2				2
Break it up									3	1					3				1
Think about it															1				1

[a] Strategies numbered in order that participants mentioned them.
[b] Said there's "no dictionaries anyway."

Passage Difficulty or Misunderstanding

When asked what they do when faced with text that they don't understand, the majority of both higher rated and lower rated reader participants responded that they would ask someone--either a co-worker, or the person who had written the text (See Table 4.17). As well, participants reported strategies which are typically reported in the literature, such as re-reading and reading carefully.

Rather than suggesting a reliance on others for help with reading, participants' reports that they would ask

Table 4.17

Repair Strategies: Passage Difficulty or Misunderstanding

	HIGHER RATED READERS									#	LOWER RATED READERS									#
	I				II						I				II					
	20	21	23	24	1	2	3	4	8	9	6	11	16	19	5	13[b]	14	15	18	9
Ask																				
Others	1[a]	2	1	1	1	1	3			7	2	1		1	3		1	2	2	7
Author			2		2		2			3	3							1		2
Read																				
Re-read/slowly		1					1		1	3		1	1		4	1			1	5
Read carefully					3			1		2					1	1				2
Keep reading											1									1
Highlight/undline	2							2		2						1				1
Listen to someone read it aloud															2					1
Discard (if not important				2						1										

[a] Strategies numbered in order that participants mentioned them.

[b] Said he had to use all these strategies for anything he reads if he wants to get anything out of it.

others suggest two points. As with word repair strategies, passage repair strategies may be so automatic that participants are not really conscious of their use in day to day reading. During reading activities in the second phase of the interview, a number did in fact employ rereading and other repair strategies. As with consulting a dictionary, referring to another person may be the strategy of choice when a text isn't otherwise comprehensible to the reader. Since this strategy takes more effort, it may be one which participants are most conscious of. As well, other research has shown that workplace communication is multifaceted and involves concurrent reading and speaking (Mikulecky, 1988).

Summary

In this chapter, I have described and compared higher rated and lower rated reader participants' metacognitive knowledge of person, task, and strategy, and have compared findings with the literature on the topic.

Comparisons of the findings suggest a number of similarities in metacognitive knowledge between the higher rated and lower rated participants. The main differences were in the area of metacognitive knowledge of person, although there were some differences in other areas. There was generally agreement between this study's findings and those in the literature.

There was only a slight relationship between participants' prior, external rating and their self-ratings of reading ability. Most participants rated themselves as average readers, but only higher rated reader participants said they were more able, and only lower rated reader participants said they were less able. The fact that they were comparing themselves to co-workers could have influenced participants' self-ratings.

Responses about outside of work reading suggest that some lower rated reader participants may not have viewed themselves as readers. The limited amount of outside of work reading done by both higher and lower rated reader participants may suggest an attitude among both groups of participants that did not favour reading. However, it should be noted that participants who worked 12 hour shifts had little time outside of work for reading or for other activities.

Both higher and lower rated reader participants mentioned education and practice as the main factors influencing the development of a person's reading ability. Higher rated reader participants were more likely than lower rated ones to mention motivation, attitude or interest as a factor in this regard.

Almost all participants in both groups mentioned pace of reading as a factor in the reading process; a number used pace as a criterion for rating their reading ability. Higher rated reader participants were more likely than lower rated reader participants to mention comprehension in relation to reading, and lower rated ones expressed more concern about oral reading. However, participants were equally aware about the roles of background knowledge and interest in reading comprehension.

Lower rated reader participants may have been more likely than higher rated ones to equate "reading" with "reading books". Higher rated reader participants seemed to view reading as having a broader range of purposes. However, there was no relationship between rated ability and interest in current affairs. This suggests that neither group was more likely to view reading as a means to keep informed.

Metacognitive knowledge in the area of task was generally similar for both groups, except that higher rated reader participants were somewhat more likely to name broader, organization-type purposes for paperwork. Participants in both groups suggested that vocabulary and lack of knowledge of the topic were the main sources of difficulty in texts.

Participants were in agreement that reading ability was necessary to be a supervisor, but lower rated reader participants were somewhat more likely than higher rated ones to suggest it was necessary for occupational workers to be able to read. Higher and lower rated reader participants tended to agree, however, that an occupational worker could manage without reading ability. As supervisors, participants in both groups saw themselves as sources of information for the workers they supervised.

In the area of strategy use, participants named similar strategies for dealing with paper work in general, and for dealing with unknown words or with passages which they did not understand. Regarding the latter, asking someone else was a commonly mentioned strategy.

CHAPTER FIVE

FINDINGS: SELF-REGULATION

In this chapter, I describe and compare participants' self-regulation of three reading activities. Self-regulation is defined as a process of planning, strategy use and monitoring.

To draw inferences about participants' self-regulation, I analyzed think-aloud protocols which were recorded while participants completed three reading activities. These activities included comparing the content of two documents about safe work procedures; selecting news passages of interest to co-workers from and stating the main ideas of the passages; and locating a particular regulation in the Alberta Occupational Health and Safety Act. The tasks for the three activities were familiar, and the texts were from or related to the industry. Participants' familiarity with the content and structures of the texts varied.

In analyzing the protocols for each activity, I looked for evidence of "behaviours that seemed to be purposeful means of understanding the text" (Lundeberg, 1987). Working from the general framework of self-regulation, I grouped the behaviours into categories and sub-categories. As patterns and questions emerged, I reviewed the literature for additional frameworks with which to interpret them, and drew from those frameworks to develop additional categories.

Once I was satisfied with the analysis and categorization, I prepared matrices to display the information, and used these to compare the findings for each reading activity.

Reading Activity One

In the first reading activity, I asked participants to compare a "Proper Task Analysis" and a "Safe Work Procedure," and to note any significant differences in content between the two documents.[1] While the type of documents and the activity of comparing them were quite familiar for participants[2], the content was novel. Both documents listed instructions for loading large chunks of overburden[3] into a heavy hauler truck. All participants were familiar with the concept and the equipment involved, but none was directly involved with the work described.

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[1] Task analyses are generally prepared by analyzing the steps for completing a particular job task, identifying potential problems, and identifying means to avoid the problems. The safe work procedures, which are used to instruct workers, are prepared from the task analyses.

[2] Supervisors, including the participants in this study, may be involved in preparing the task analyses and work procedures, and they are responsible for reviewing the procedures with workers on their teams. Supervisors also have to observe workers as they carry out a procedure to ensure that the steps are followed as outlined. In some cases, workers find better ways to complete a task; the new way is then compared with the established procedure and adjustments are made.

[3] Overburden is the layer of earth and muskeg which must be removed to provide access to oil sands which lie beneath it. The chunks which are loaded can be as large as a room.

Analysis

In analyzing data, I identified the following categories of self-regulation indicators: taking stock and planning; evaluating comprehension; strategies (general and repair); and monitoring and monitoring failure.

Taking Stock and Planning

I used the term "taking stock" to refer to those aspects of self-regulation which have to do with "analyzing the problem at hand" and "reflecting on what one does or does not know that may be necessary for a solution" (Meicehnbaum, 1986, p. 25). The literature suggests that proficient readers inspect text to activate prior knowledge and establish a framework for new information (Baker, 1989). Lyman & Collins (1990) suggest that critical readers evaluate the "adequacy of their own schemata."

As shown in Table 5.1, almost all participants demonstrated that they engaged in stock taking actions. Most determined the topic of the passages, either by reading "down through...the first five steps...to get a feel for what it is" (20), or more usually, by referring to the headings on one or both of the documents: "Ok, so what are we talking about here. Loading lumps, Overburden, Mining, Ok. Loading big chunks, OK" (3). As well, about half the participants in each group established whether they were familiar or not with the topic. For instance, one participant noted:

> When I saw demag, it showed me that I'm dealing with overburden right. Now that's an area I'm not familiar with, but I knows some of the equipment that they use out there. (5)

Table 5.1

Activity One: Taking Stock/Planning

	HIGHER RATED READERS									#	LOWER RATED READERS									#
	I				II						I				II					
	20	21	23	24	1	2	3	4	8	9	6	11	16	19	5	13	14	15	18	9
Determine topic	+	+	+	+	+		+	+		7	+	+		+	+	+		+	+	6
Headings		+	+	+	+		+			5	+	+		+	+	+			+	6
First steps	+									1										
Determine																				
Genre	+	+		+	+			+		5									+	1
Ext. structure	+	+			+					3	+				+	+	+	+	+	6
Length/overview	+			+			+	+		4			+							1
Assess knowledge																				
"I'm familiar"					a					1										
"I'm not familiar"	+	+	+			a			+	5		+		+	+	+				4
"This is new"												+				+				2
Clarify set task		+								1					+		+		+	3
Clarify plan					+					1	+		+	+						3
Establish plan	+			+		+		+		4		+								1

[a] These participants commented on relevant knowledge in the course of reading.

As well as taking stock of the content, most participants noted structural features. There were differences, however, between what the participants in each group tended to note. Lower rated reader participants were more likely to attend to the headings under which content was organized in each document. Higher rated reader participants' actions seemed to reflect an interest in gaining an overall sense of the texts. They were more likely to note whether documents were analyses or procedures, and to survey their length. As one participant noted:

> Having a quick look here to see how long it is, that's the first thing I'd do. When I get a new procedure, I always look at it, how long is this thing, is it way out to lunch or is it a reality. The big long ones you better look out for because they are generally crazy. (3)

Lundeberg (1987) found that expert readers of legal cases were more likely to survey cases than novices. However, in this study, higher rated and lower rated reader participants had similar experiences with the documents they were reading.

In presenting participants with the reading activity, I had specified the purpose or task, namely to compare the two documents and to note any significant differences between them. Most participants either demonstrated a planning action by restating the purpose or by describing their plan for accomplishing it. The lower rated reader participants, however, tended to check with me about the purpose, or about what plan they should follow to accomplish it: "So you want me to look at the sequence of steps, compare it with this one there" (5). Higher rated reader participants were more likely to state their plan directly:

> I'm just wondering which way I should be doing it, because I started going through the steps to see if I could understand what's happening. I got thinking probably I should read step number one and step number one.... (4)

Two lower rated reader participants also commented that in a real situation they would read the documents carefully because the content was unfamiliar. One noted, "This is something I don't do, therefore if I was asked to do it I would have to sit down and study it, more than just glance through it" (13). One higher rated reader participant also commented after he had completed that activity:

> actually, things like that, especially technical things, I tend not to read fast. I tend to read them through four times. I didn't with that. (24)

These participants showed awareness of relationships between planning and purpose, and their comments reflected the influence of context. They carried out the activity differently in the interview than they would have on the job. These comments point to limitations about studies such as mine: Although natural texts are used, it is not possible to replicate the context for using the texts.

Evaluating Comprehension

Monitoring in reading requires readers to evaluate whether or not they are comprehending as they read. According to Baker (1985), mature readers use several different criteria or standards to evaluate their comprehension. Baker has identified and described three such standards and has carried out studies to determine the extent of their use by adults of differing reading proficiency. As Baker describes them, the standards include a lexical standard, or evaluation of individual word understanding; a syntactic standard, which involves sensitivity to grammatical constraints; and a semantic standard. The semantic standard includes five sub-categories: 1) propositional cohesiveness, or whether ideas in adjacent propositions can be integrated successfully; 2) structural cohesiveness, which involves checking that ideas are thematically compatible; 3) external consistency, or checking that ideas are consistent with what one already knows; 4) internal consistency, or checking that the ideas expressed in a text are consistent with one another; and 5) informational clarity and completeness, which involves checking that the text clearly states all the information necessary to achieve a specific goal.

I inferred which standards participants used from their comments or actions while reading. As shown in Table 5.2, participants generally employed the lexical standard and/or one or more of the following semantic standards: external consistency, internal consistency, and clarity/completeness. One higher rated reader participant also used a propositional cohesiveness standard. Higher rated reader participants tended to use more standards than lower rated ones: Four used four standards, and three employed three. (One lower rated reader participant used four standards, and four used three.)

Table 5.2

Activity One: Evaluating Comprehension

	HIGHER RATED READERS									#	LOWER RATED READERS									#
	I				II						I				II					
	20	21	23	24	1	2	3	4	8	9	6	11	16	19	5	13	14	15	18	9
Evaluation stdrd.																				
Lexical	+	+	+	+	+	+	+		+	8	+	+	+		+	+	+	+		7
Prop. cohesiveness	+																			
External consist.			+			+	+		+	4				+			+			2
Internal consist.	+	+	+	+	+	+	+	+	+	9	+	+	+	+	+	+	+	+	+	9
Clarity/complete.	+	+		+		+	+		+	6		+	+		+	+	+			5
	4	3	3	3	2	4	4	1	4		2	3	3	2	3	3	4	2	1	
Conclusions																				
Some differences				+			+	+		3							+			1
The same	+	+	+		+	+			+	6	+	+	+	+	+	+		+	+	8
Different words					+				+	2	+	+			+		+	+		5
More details				+				+	+	3		+	+		+	+		+	+	6
Extra step	+	+	+	+		+		+	+	7	+		+							2
Different format														+	+					2

Lexical standard. Participants seemed to make frequent use of a lexical standard, which is consistent with Baker's findings. There were some differences between groups, however, in the nature of comments or actions from which I inferred use of this standard. For instance, five lower rated reader participants said that the two documents were just "worded differently," while only two higher rated reader participants made this comment. As well, two lower rated reader participants commented about "just making sure I get all the words right" (6).

Three higher rated reader participants made and corrected oral reading miscues, and one made a miscue which he did not correct because it did not change the meaning. None of the lower rated reader participants made miscues. As well, more of the higher rated reader participants mentioned that the documents differed in the use of the terms "lump" and "chunk", although they concluded that the terms were "the same difference" (23). When questioned about whether they had noticed the terms "lump" and "chunk", additional lower rated and higher rated reader participants said that they had, but that they hadn't mentioned it because the words meant the same thing. Baker found that some participants in her study did not report the presence of nonsense words because they had inferred plausible meanings for them and suggested that they evaluated and regulated their reading. This seems to have been the case for those who did not report the difference in terminology in this study.

Participants' actions and comments suggest a different emphasis on the role of words between the higher and lower rated reader groups; the higher rated reader participants seemed more likely to concern themselves with words when they interfered with comprehension.

External consistency standard. More higher rated reader participants than lower rated ones employed an external consistency standard. This may suggest that higher rated reader participants were more likely to relate ideas in the text to their own knowledge. However fewer than half of either group made use of this standard. Comments from which I inferred use of this standard include:

> By not doing that you could cause injury to the driver, give him a royal shaking if that thing fell off, he better have his seat belt done up. (3)

> They sure as heck don't put two scoops of base material in the bottom of the truck box to stop them, it would blow. We're the ones that gotta patch the holes in the truck box. (23)

Internal consistency standard. Baker (1985) found that although participants in her studies employed standards spontaneously, they were more likely to employ a particular standard if given specific instructions to do so. It is not surprising then, that all participants in my study employed an internal consistency standard, since I had directed them to look for differences, or inconsistencies, between the two documents. According to Baker, an internal consistency standard has to do with whether ideas within a passage make sense in light of other ideas in the same passage. I revised the concept slightly to account for participants' evaluation of whether ideas in one document were consistent with ideas in the other. I inferred use of an internal consistency standard from comments about content being "the same," and from such comments as the following:

> Number 7 on this page, the analysis one, the guy could shake the heck out of it. This one [procedure] it says slow. (3)

> You've made the truck driver aware of it and you are saying unawareness can result in injury, which is exactly what you have said in the analysis. (20)

Clarity/completeness standard. The clarity/completeness standard would seem to be an important one to apply to this activity, since supervisors are required to make judgements about whether workers can follow the procedures. An almost equal number of participants in each group evaluated the clarity and completeness of the task, but the nature of their evaluation varied. Four participants made judgements about which of the two documents was a better set of instructions: "I would take this side, because here to me is broke down more" (5); "This one is more comprehensive..." (24). Three participants commented that there was more information than necessary in the documents, noting that: "There's a certain amount of things you've got to know...If you have to print everything out...then you've got the wrong fellow" (8). One participant noted that one of the documents had more detail than he thought was necessary.

Strategy Use

As shown in Table 5.3, participants in both groups either read the documents "extensively" for global understanding, or "intensively" to analyze specific information. Almost the same number in each group chose one or other of these general strategies. (As discussed in the section on planning, one participant in each group who adopted an extensive reading strategy said that he would use a more intensive approach under real conditions.)

Table 5.3

Activity One: Strategy Use

	HIGHER RATED READERS									#	LOWER RATED READERS									#
	I				II						I				II					
	20	21	23	24	1	2	3	4	8	9	6	11	16	19	5	13	14	15	18	9
Strategies																				
Extensive reading		+	+	+	+					4	+		+	+		+			+	5
Intensive reading	+					+	+	+	+	5		+			+		+	+		4
Paraphrase	+	+		+		+	+	+	+	7	+	+	+	+	+		+		+	7
Define words	+							+		2	+									1
Visualize	+	+	+	+	+		+			6							+			1
Question	+	+		+			+		+	5		+							+	2
Take a perspective							+			1		+			+					2
Glance/rd. quickly				+						1						+			+	2
Sum up					+	+				2	+									1
Infer																				
Repair strategies																				
Re-read (phrase)	+			+		+		+	+	5		+			+		+			3
Re-read (word)		+	+	+			+			4										
Revise																		+		1
Terminate												+								1

Participants were equal in their frequent use of paraphrasing as a strategy; seven participants in each group paraphrased as they read. Although there were some differences in the nature and extent of the paraphrases between the two groups, use of this strategy suggests integration of information by all participants.

There was a marked difference in the reported use of visualizing as a strategy. Six higher rated reader participants and one lower rated one mentioned using this strategy. Examples of reports on this strategy use include:

> As I read it I can actually picture this thing being done. I can picture the truck being backed up into, under the demag and I can picture the guy getting the two buckets under it and just bam it into the truck box without being cushioned.... (1)

In most cases, a visualizing strategy was activated at the start of reading, although in some cases it was reported in conjunction with having encountered some difficulty with understanding. For instance:

> I'm trying to picture a truck, because I'm not operations oriented. I just know trucks and motors. I'm trying to keep visually in mind the truck and the shovel and this process going on. I can even see a truck bouncing up and down when this thing hits the box if the dirt is not put in like it should be. (20)

> Well I couldn't really figure out what this one was doing at first so I...was trying to picture what the shovel was doing up against the bank. What he's doing is pushing the lump up against the bank and he's wiggling his bucket to try and shake it, get in there. (24)

The strategy of visualizing or generating other forms of mental imagery is not widely mentioned in the literature on self-regulation. Long, Winograd and Bridge (1989) report that while evidence from several sources suggests that mental imagery is involved in the reading comprehension process, little is known about the role of mental imagery during reading. Some studies have shown a relationship between instruction or practice in forming mental images and increased comprehension. However others have shown that both good and poor readers may use mental imagery spontaneously. Studies generally do not show a relationship between spontaneous use of mental imagery and scores on standardized reading tests.

Some researchers, according to Long et al., have suggested that readers generate images to access background knowledge. Protocols suggest that this is what readers in this study may have been doing. While participants in both groups initially took stock of the topic and of their knowledge of it, the higher rated reader participants may have been more likely to make active use of that knowledge. On the other hand, they may have been more likely to report use of this strategy. The one lower rated reader participant who mentioned visualizing did so after he had completed the reading activity; when asked about whether he noticed a difference in terminology, he said no, "because I was visualizing..." (14).[4] One has to ask if other lower rated reader participants actually did not employ a visualizing strategy, or if they did visualize but did not report this.

As well as visualizing, higher rated reader participants were more likely than lower rated ones to pose questions while reading. Questions were about content--"It says to position a truck...I'm just wondering how they would do that" (21), and about the process for doing the task--"I'm just wondering which way I should be doing this" (2).

Comprehension Monitoring and Repair

Participants who employed an intensive reading strategy were more likely to experience comprehension difficulties. Participants in both groups generally detected these. Consistent with what they had reported and with the literature, participants used re-reading as a repair strategy:

---

[4] Long et al. (1989) suggest that genre is one factor which influences the generation of mental imagery, and that such generation is more likely for narratives or literary texts. Thus it is interesting to note that the one lower rated reader who did report visualizing was also the only lower rated reader participant who reported that he frequently read fiction.

> They lost me here some place...Um, ok. No, I lost myself. It looked like they had it on the truck and they didn't. (2)
>
> It says 'pull the stick back...so as to centre lump into centre of the box', and centre seems to keep coming up there. So I'll read this over again to find out if centre is not throwing me off in some sense. (24)

Some participants in both groups failed to detect miscomprehension. This generally occurred when they inadvertently compared steps of different numbers. They reported these as differences between the documents. When prompted, most participants were able to remedy the problem through re-reading, however, one lower rated reader participant was not able to do so. He eventually said that he "would not bother with all this" (11), that is, he would terminate the activity.

Reading Activity Two

For the second reading activity, I gave participants an article which described, month by month, key events that had occurred in the company during the previous year. I asked them to select passages of interest to the people they supervised, and to state the main idea of those passages.

Identifying the main idea of a passage is thought to be key to comprehending text (Afflerbach, 1990).

As discussed in chapter 4, participants had noted that supervisors frequently read memos and other prose correspondence to determine their relevance and/or importance. These comments confirmed earlier observations which I had made at their worksite. I had selected the article for the third activity because it included short prose passages on a variety of topics related to the workplace. The passages differed as to whether their main ideas were explicitly stated or implied. Passages were identified by month rather than by a descriptive heading or title, so participants had to read at least part of a passage to ascertain what it was about. (Appendix B includes a copy of the article.)

Some limitations or complications regarding this reading activity have become apparent. First, I had actually given participants two purposes for the activity: 1) to select passages of interest to the workers they supervise, and 2) to state the main idea of those passages. While it was evident from comments that some participants kept the first purpose in mind, some participants focused more on the second purpose, and proceeded through the passages as an exercise in identifying main ideas. As well, when some participants had problems with the "July" passage early in the study, I decided to find out how the remaining participants would deal with that passage. I directed subsequent participants to read that article and to state the main idea, even though the passage was not necessarily of interest to them. This changed the activity from a more naturalistic one to a more contrived one.

Second, all of the lower rated reader participants had taken part in a reading course where strategies for identifying main ideas were emphasized; in the previous reading assessment interview, participants in the lower rated reader group had experienced difficulty in identifying explicitly stated main ideas. When asked in this study about the value of the reading course, a number of participants had commented about learning main idea strategies. Their instruction may have influenced how they approached this reading activity.

Analysis

I considered the following areas in analyzing data: general self-regulation, the nature of main idea responses which participants produced, monitoring failure, and strategies for selecting or constructing main ideas.
As well, I considered the influence of prior knowledge on main idea selection and construction.

To do the analysis, I drew from the general literature on self-regulation, from a main idea classification system developed by Cunningham and Moore (1987), and from a main idea construction model developed by Afflerbach and Johnston (1986). The classification system and construction model are described further on.

General Self-regulation

When presented with this reading activity, a small number of participants in each group "took stock" of the article. (See Table 5.4.) Two higher rated and three lower rated reader participants began by reading the general overview at the top: "Just reading the first few lines here seeing where you got this from, what it is all about" (21); "If there's nothing in it...I wouldn't look at the rest of it, I probably wouldn't read any of it" (13).

Table 5.4

Activity Two: General Self-regulation

	HIGHER RATED READERS									#	LOWER RATED READERS									#
	I				II						I				II					
	20	21	23	24	1	2	3	4	8	9	6	11	16	19	5	13	14	15	18	9
Stock taking																				
Heading		+		+						2		+				+		+		3
Interested											+									1
Not interested				+		+	+			3						+				2
Strategies																				
Scan/glance/skim			+					+	+	3			+	+	+					3
Look for key words			+	+	+					3	+				+	+	+			4
Read first lines				+		+	+			3	+									1
Slow down for intr.					+				+	2	+									1
Read quickly											+	+								2
- if familiar			+							1										
Read everything		+																		
- if interesting					+					1										

Three higher rated reader participants started by expressing disinterest regarding the source of the article. For instance, some participants commented: "[Title]'s a bad example because it usually ends up in the filing cabinet in the corner, the little round thing over there" (2); "I barely glance through [title]...we get enough memos at work" (3). Although a number of higher rated reader participants had suggested that general interest in work contributed to development reading ability (reported in chapter 4), the above responses suggest that some higher rated readers were not interested in keeping abreast of workplace developments through this text.

Most participants in both groups seemed to start reading with the first passage. Their comments suggest that higher rated and lower rated reader participants employed similar strategies to identify whether a passage was of interest. Their responses were also consistent with their comments, discussed in chapter 4, about the strategies they use to deal with incoming mail.

As shown in Table 5.4, three participants in each group mentioned scanning, glancing or skimming: "I scan through it quickly and if something doesn't catch my eye I don't even read it probably" (4). Three and four participants in each group mentioned looking for key words, sometimes in combination with another strategy: "I'm looking for a certain [thing] that will tell me there's something very important" (14); "I started reading the top, and then I seen the WHIMIS and CMIS and then I skimmed a few lines down to the bottom" (23).

Three higher rated reader participants and one lower rated one mentioned reading the first few lines as a strategy: "the first line, you can tell what they're talking about" (2); "If it's not in the first paragraph, if that doesn't get my attention, then I move on" (3).

Main Idea Responses

In order to decide whether participants had achieved the purpose of stating the main ideas of passages, I analyzed their main idea responses. In analyzing these, I was considering the outcomes of participants' reading, rather than their reading processes. However, this categorization was a necessary step towards analyzing main idea construction strategies and monitoring failure. Analysis was complicated by the nebulous nature of the main idea concept (Bauman, cited in Afflerbach, 1990), and by the fact that main idea responses can vary according to readers' purposes and backgrounds, among other things (Winograd & Bridge, 1986).

Cunningham and Moore (1986), arguing that different types of main idea responses are legitimate, defined nine terms to account for the responses good readers gave when directed to identify a main idea. (Table 5.5 outlines

Cunningham and Moore's classification system. It includes examples from responses of participants' in this study.)

Using the Cunningham and Moore definitions as rules, I categorized participants' main idea responses by comparing them with the relevant passages. I analyzed main idea responses for the first five passages (January to May) since most participants had chosen to read these. I also analyzed responses for the July passage, which I had directed participants to read once I noted that it was more difficult than the others. The February, March and May passages included sentences which could be identified as an explicit main idea. However, participants did not necessarily use these sentences for their main idea responses.

In categorizing responses, I attempted to distinguish between responses which were textually-based and those which seemed to be contextually based. Van Dijk (cited in Winograd & Bridge, 1986) distinguished between textually and contextually important information. Textually important information has to do with what authors consider to be important, whereas contextually important information reflects the readers' perspectives. As an example, consider the "February" passage from the article for this reading activity. The textually important information in this passage is stated in the first sentence:

> In 1988, [company]'s benefit plan will change to include coverage of eye examinations for employees and their dependents over 18 and under 65 years of age.

Table 5.5

Cunningham and Moore's (1986, pp 6-7) Main Idea Response Classification System (Adapted)

Response	Definition and example from reading activity two
Gist	A summary of the explicit contents of a passage achieved by creating generalized statements that subsume specific information and then deleting that specific (and now redundant) information. "They've come up with a new system...and there isn't gonna be supervisors, just the management level..." (8). (July passage)
Interpretation	A summary of the possible or probable implicit contents of a passage. "Trying to improve their efficiency and broaden everbody's skill or capacity to do the work, to get...more done with less people by the sounds of it" (21). (July passage)
Key word	A word or term labelling the most important single concept in the passage. "That's the WHIMIS system" (15). (May passage)
Selective	A summary or diagram of the explicit contents of a passage achieved by or selecting summary and combining the most superordinate and important words and phrases (diagram) (or synonyms for them) from a passage. "...policy in the travel department, it's new, supposedly helping the company be more cost effective" (21). (April passage)
Theme	A generalization about life or the universe that the passage as a whole implies or illustrates but which is not topic or key word specific. "This is where these types of things are coming out of, where they started from...basically that's what they're talking about is upgrading the supervisors and people" (13). (July passage)
Topic	A phrase labelling the subject of a passage without revealing specific content from the passage. "Basically what this is telling me is that they are buying some trucks" (8). (January passage)
Topic sentence	The single sentence in a paragraph which tells most completely what the paragraph or passage as a whole states or is about. "In 1988 [company] benefit plan will change to include coverage of an eye examination for employees and dependents over 18 and under 65 years of age" (2). (February passage)
Other	Any response that cannot be classified as one of the other main idea types. These would include all literal and critical responses. "They bought them trucks...they were a wreck when they bought them" (16). (January passage)

Note. An additional category which was not applicable to Reading Activity Two was "title", or the given name of the passage.

After reading this passage, a participant responded that the second sentence was the "heart of the story":

> Dependents 18 and under and 65 and over will continue to be covered by Alberta Health Care. (2)

This participant argued that the first sentence "tells you about [company], but this is where...the benefit is...that's a global issue" (2). I categorized his response as a contextually-based, topic sentence one because the sentence he identified as the main idea reflected his interest or point of view.

I also considered whether the reader seemed to be considering textually important information, but was doing so inaccurately. As an example, a participant gave the following main idea response for the February passage:

> It's for employees and dependents 18 and under 65 years of age, 65, and everyone's covered by the Alberta Health Care until they're 65 years old. (19)

As another example, consider this participant's main idea response for the March passage: "We had to get approval from management for the cost of repairs" (18). Although the article mentioned the cost of repairs, the textually-based main idea was that "management approved the construction of an extension to the heavy duty shop." I categorized this participant's response as an erroneous summary, since he was combining ideas from the text inaccurately.

The categorized responses, listed on Table 5.6, are the last unprompted responses which a participant made. For instance, if a participant gave a key word response, followed by a topic response, I listed the second response. If a participant made a key word response, and followed it with a topic sentence response in answer to my prompting, I listed the first, unprompted, response. Sometimes participants corrected erroneous responses in answer to my prompt, but I listed the erroneous response. A corrected response was listed only if the correction was unprompted.

As Table 5.6 shows, participants gave a range of main idea responses. Overall, the majority of main idea responses made by participants in both groups were textually-based. Seven higher rated and four lower rated reader participants gave contextually-based responses. Four participants in each group gave erroneous responses. Erroneous responses are discussed in the section on monitoring failure.

Table 5.7 compares the totals of each kind of main idea response made by participants in each group. From this table, it seems that higher rated and lower rated reader participants gave almost the same numbers of types of responses, except that the lower rated reader participants gave twice as many gist-type responses as the higher rated reader participants. However these gist-type responses accounted for only 12% of that group's total responses.

Table 5.6

Activity Two: Main Idea Responses

	HIGHER RATED READERS									#	LOWER RATED READERS									#
	I				II						I				II					
	20	21	23	24	1	2	3	4	8	9	6	11	16	19	5	13	14	15	18	9
January										9										7
Gist																	+			1
Key word					+					1										
Summary	+							+		2					+				+	2
Topic		+	+			+	+		+	5			+					+		2
Other				+						1		+		+						2
February										9										8
Gist															+					1
Key word									e	1	+						+			2
Summary	+	+	+							3				e						1
Topic				+						1										
Topic sentence					c	+	+	c		4		+	c					+	+	4
March										9										8
Gist				e						1		+		+						2
Key word									c	1						c				1
Summary																			e	1
Topic	e	+				+		+		4			+		e		+	+		4
Topic sentence			+		+		+			3										
April										7										8
Interpretation																		+		1
Key word						+	+		c	3			+							1
Summary	+	+		e						3										
Topic											+	+		c	+					4
Topic sentence			+							1							+		+	2
May										7										8
Gist				+						1										
Interpretation			+							1										
Key word						+				1				+	+		+	+		4
Summary													+						+	2
Topic		+					c		+	3	+	+								2
Topic sentence					+					1										
July										7										9
Gist									+	1		+					+		+	3
Key word						c	c			2			+							1
Summary																				
Interpretation	+	+	+	+						4	+			+	+			+		4
Topic																c				1
Textual	4	6	6	4	3	5	4	2	3	37	4	5	5	4	5		6	6	5	40
Contextual					1	1	2	1	2	7			1	1		2				4
Erroneous	1			2					1	4		1		1	1				1	4
Total	5	6	6	6	4	6	6	3	6	48	4	6	6	6	6	2	6	6	6	48

Note. + = textually based response; c = contextually based response; e = erroneous response.

Table 5.7

Activity Two: Total Main Idea Responses by Categories

Category	Higher Rated Readers	Lower Rated Readers
Gist	3	7
Interpretation	5	5
Keyword	9	9
Summary	8	6
Topic	13	13
Topic Sentence	9	6
Other	1	2
Total	48	48

Monitoring Failure

As explained in chapter 3, I defined monitoring failure as failure to accomplish a purpose while being confident that one has accomplished it. As shown in Table 5.6, both higher rated and lower rated reader participants gave some erroneous main idea responses, while seeming confident that they were accurate. There was only one instance when a participant expressed lack of confidence in an erroneous response: "You have to help me here, I'm not too sure" (5). These findings suggest that both the higher rated and lower rated reader participants were likely to experience some monitoring failure. Monitoring failure may have been affected by the fact that participants were often scanning or skimming to find if a passage was of interest. In any case, other studies have shown that monitoring failure is not uncommon, even for expert readers (Baker, 1989).

In an earlier analysis of this data, I had counted all contextually based main ideas as erroneous, as I was judging them against textually important information. Had I continued to count those responses as erroneous, the rate of inferred comprehension monitoring failure for both groups of participants would have been twice the rate determined by the current analysis. In that case, monitoring failure would have appeared to be an issue for both groups. The differences between the analyses underline the importance of considering responses from readers' as well as authors' points of view before judging responses as accurate or erroneous.

Constructing Main Ideas

Afflerbach (1990) and Afflerbach and Johnston (1986) distinguish between selecting main ideas which are explicit, and constructing main ideas when they are not explicit. In a study of expert readers, they identified five strategies for constructing main ideas. As described by Afflerbach (1990), overall construction strategies include 1) draft-and-revision, 2) topic/comment, and 3) automatic construction. Additional construction strategies include 4) initial hypothesis, and 5) listing.

The draft and revision strategy involves stating a main idea which the reader considers to be unsatisfactory and which the reader proceeds to revise. The topic/comment strategy has to do with cases where the reader can state only the topic, rather than the main idea; the reader qualifies the topic with a comment. The automatic construction strategy was not defined; Afflerbach and Johnston (1986) explained that because automatic construction by-passes working memory, the process was not externalized by participants in their study.

When employing the initial hypothesis strategy, the reader generates a main idea based on reading the title or first sentence or skimming the text. The reader then monitors the accuracy of and amends the hypothesis as he or she continues through the text. The listing strategy has to do with searching for important or related words, concepts or ideas from the text or from memory and using these ideas to construct the main idea.

I used these definitions to analyze how participants arrived at their main idea responses. Because participants had not always selected the topic sentence from passages in which such a sentence was explicit, I analyzed responses for all of the passages for which I had identified participants' main idea responses.

As Table 5.8 shows, participants in both groups generally employed an automatic construction process to

Table 5.8

Activity Two: Main Idea Selection and Construction

	HIGHER RATED READERS									#	LOWER RATED READERS									#
	I				II						I				II					
	20	21	23	24	1	2	3	4	8	9	6	11	16	19	5	13	14	15	18	9
January										9										7
Auto	+	+	+	+	+	+	+	+	+	9		+	+	+	+		+	+	+	7
February										9										9
Auto	+	+	+		c	+	+	c	e	8	+	+	c	e	+	+	+	+	+	9
Initial hypothesis				+						1										
Listing		+								1										
March										9										8
Auto	e	+		e	+	+	+	+	e	8		+	+	+		+	c	+	e	7
Initial hypothesis																				
Draft/revise			+							1					e					1
Listing															e					1
April										7										7
Auto	+	+	+	e		+		+	c	7	+		+	c	+		+	+	+	6
Initial hypothesis												+								1
May										9										8
Auto	+	+	+	+	+	+	c	+	+	9	+	+	+	+	+		+	+	+	8
July										7										9
Auto	+	+	+			c	c		+	6						c				1
Initial hypothesis				+						1										
Draft/revise												+	+	+						3
Listing											+	+		+	+		+	+	+	7

arrive at main idea responses, except in relation to the July passage. On this passage, all of the higher rated reader participants who had been directed to read the passage employed an initial hypothesis construction process (Participants who had been interviewed early had not been directed to read the passage. They had constructed key word main idea responses and had decided not to read the passage.) One of the lower rated reader participants employed an automatic process for this passage, but his main idea response was a contextually based one: "...produces a broadly skilled workforce. This is where these types of things are coming from...upgrading people and supervisors" (13). Other lower rated reader participants employed draft and revise or listing strategies. Findings from a study by Afflerbach (1990) help interpret these differences, as discussed below.

Prior Knowledge and Main Idea Construction

In his study of expert readers reading texts of differing topic familiarity, Afflerbach found a relationship between prior knowledge about the topic of a passage, and the type of main idea construction strategy a reader used. He found that prior knowledge facilitated automatic construction of main idea responses and that an initial hypothesis construction strategy was more likely to be used by a reader with prior knowledge. Readers without prior knowledge of a topic would more often use a draft and revise and/or listing strategy.

These findings account for the high incidence of automatic construction of main ideas during this reading activity--most of the passages were on familiar topics. It also accounts for differences between higher rated and lower rated reader participants' construction strategies for the July passage.

As shown in Table 5.9, all higher rated reader participants who read the July passage activated prior knowledge about the management changes described in this passage. In doing so, most mentioned the term "social tech": "... this new concept of social tech they want to bring in" (20); "Like I know what they're getting at, I know what's been happening over there" (21); They're doing a restructuring on their management, but I think in utilities, don't they call them super techs or whatever?" (23).

Table 5.9

Activity Two: Prior Knowledge

	HIGHER RATED READERS								#	LOWER RATED READERS									#
	I				II					I				II					
	20	21	23	24	1	3	4	8	5	6	11	16	19	5	13	14	15	18	9
Prior knowledge	+	+	+	+				+	5		+								1
I don't know										+			+	+		+		+	4
I'm not interested														+	+				2
Not relevant			+			+	+		2			+	+						2

In contrast, only one lower rated reader participant activated prior knowledge before reading: "They got social techs, don't ask me where do I get that word social tech" (11). A number of other lower rated reader participants actually indicated that they did not know about the topic: I don't even know what they're..." (19); "I don't really understand it" (14).

Because higher rated reader participants arrived at a main idea response more quickly and with more confidence than the lower rated reader ones, I had initially judged them to be better at self-regulating regarding this passage.

However, given differences in prior knowledge, in light of Afflerbach's study, both groups of participants were employing appropriate strategies. The question which emerges from these results has to do with why the higher rated reader participants were familiar with the topic when so few of the lower rated reader participants were.

Reading Activity Three

In the third reading activity, I asked participants to engage in an information seeking task. Using the Alberta Occupational Health and Safety Act (OH&S Act), they were to find a regulation about workers' rights to refuse to do dangerous work.

Supervisors at this workplace refer to company handbooks and equipment manuals, and participants in this study who had taken part in reading assessment interviews had successfully located information in the company employee handbook. However, I anticipated from previous experience that the OH&S Act would not be a familiar text for participants, that the language and organization would be more complex than that of their usual references, and hence, that this activity would be more challenging than the other two.

As an introduction to this activity, I asked participants about their familiarity with the OH&S Act, and to compare the Act with an easier to read overview called An

Employer's Guide to the Occupational Health and Safety Act. (Their comparisons also provided an additional source of information about their task-related metacognitive knowledge, which was discussed in chapter 4.) I then confirmed that participants knew about the regulation concerning workers faced with unsafe conditions and asked them to find the regulation in the Act. The Employers' Guide was available to them as they carried out the activity. When some participants were unsuccessful in finding the regulation in the Act, I referred them to a pertinent section in the Employers' Guide for information which would help them in their search. I asked participants to think aloud as they carried out the activity. (Excerpts from the OH&S Act and the Employers' Guide are in Appendix B.)

Analysis

I adapted an information finding model developed by Guthrie and Mosenthal (1987) to categorize participants' self-regulation actions. While the model was originally developed in relation to finding information in tables, charts and other documents, Dreher and Guthrie (1990) used the model to investigate college students' locating of information in text books through the use of indexes, tables of contents, glossaries and the like. As described by Guthrie (1988) and Dreher and Guthrie (1990), the model proposes five components: 1) goal formation, 2) category selection, 3) information extraction, 4) information integration, and 5) recycling. Locating information efficiently, according to this model, depends on the speed and accuracy with which a reader carries out each component.

Goal formation has to do with verbalizing the information which is to be found (Guthrie, 1988); often goal formation is manifested as a question. _Category selection_ was described in the original information seeking model as selecting relevant categories of information from a document--table, chart, etc.--for inspection (Guthrie, 1988). For their study, Dreher and Guthrie (1990) distinguished two components of category selection: text access category selection and conceptual category selection. Text access category selection involves decisions about how to begin the search, for instance by checking an index or by paging through the text. Conceptual category selection has to do with selecting a term or concept from an index or table of contents, or other "access system." I added two other components: content schema access and structure schema access category selection. These have to do with participants' access to and use of background knowledge regarding the content and structure/organization of a text.

Extraction of information and _integration of information_ involve searching the text for relevant information, and combining that information with known information to meet the goal. _Recycling_ refers to recycling through the first four components until the goal is achieved or the task is terminated. In my study, I used the extraction of information component to refer to participants' sampling of text which they accessed after selecting a category. Integration of information involved comparing the sampled text to the question to determine whether the information answered the question. I also added a component, search plan, to account for the overall plans which participants used in employing and recycling through the components. In analyzing data in terms of these components, I also considered participants' comprehension evaluation, monitoring and repair strategies.

Goal Formation and Text Access Category Selection

In this study, I provided the goal by asking participants to find a specific regulation in the OH&S Act. Regarding text access, all of the participants decided to use the table of contents. A few participants initially checked the first page, looked for an index in the back of the Act, or "browsed" through the first few pages; they all quickly returned to the table of contents when their first attempts at text access were not successful.

Content Schema Access and Conceptual Category Selection

Information in the *Occupational Health and Safety Act* is organized in numbered sections, sub-sections and so on. These sections are listed in the table of contents by title and number. The regulation about workers' right to refuse dangerous work is included in section 27 and is listed under the heading, "Existence of Imminent Danger," a phrase from the regulation. In order to access the regulation through the table of contents, a reader needs to recognize the relevance of this heading.

As shown in Table 5.10, all higher rated reader participants, except one, were able to select the pertinent category in three or fewer selections. No lower rated reader participants, on the other hand, selected this category independently. Some gave up the search after selecting one or two categories and sampling related text, while some persisted, sampled as many as five categories, and then gave up. In a review of information seeking studies, Dreher and Guthrie (1990) concluded that effective information seekers selected information categories that matched features of the goal and selected a minimum number of categories to examine.

It seemed that schema access played a crucial role in whether participants were able to select the most pertinent category--existence of imminent danger--with minimum selections (see Table 5.10). I inferred participants' initial schema activation from their responses to my question, "Do you know about a regulation to do with workers faced with dangerous situations?" In responding, all participants referred to the regulation in terms of a right to refuse, for example: "They can refuse to do it if they don't think it's fit" (2). Four higher rated reader participants also included the term "imminent danger" in their reference, for instance: "They got the right to refuse work, or the right to refuse a job...on the grounds of imminent danger" (23). Participants' responses seemed to reflect either a more general or more specific conceptualization about the regulation; this in turn influenced their category selection.

Table 5.10

Activity Three: Conceptual Category Selection

	HIGHER RATED READERS										LOWER RATED READERS									
	I				II					#	I				II					#
	20	21	23	24	1	2	3	4	8	9	6	11	16	19	5	13	14	15	18	9
Schema access																				
"right to refuse"	+	+	+	+	+	+	+	+	+	9	+	+	+	+	+	+	+	+	+	9
"imminent danger"	+		+				+	+	+	5										
Conceptual category																				
Definitions																		3		
Obligations...					3						2	x		2	x					
Order to remedy					4								x		2				1,5	
Inspection												x			x					
Danger to persons..		1		1	2	x	1	1	+		1,3	xx		3	1,4	1	1	x1	2	
Order stopping...												x	x							
Protection...		x		x	1	x						1	1		3	x		2	3	
Investigation																				
Hazards						x	2						x				2			
Joint worksite...														4						
...imminent danger	1	2	1	2		1	3	2	1											
Where disciplinary.																		x		
Disciplinary action					5													x		
Enforcement...																				
Regulations														1					4	

Numbers refer to order in which categories were selected and sampled.
x refers to categories which were considered but not sampled.

Three of those who activated the specific concept chose "existence of imminent danger" in their first category selection. One who had activated the concept, but who did not initially select the related category, had commented that "they won't have it under imminent danger, that's too easy" (3).

Higher and lower rated reader participants who had activated only the more general concept--right to refuse work--looked for categories related to the idea of dangerous work. For instance, eleven participants chose "dangers to persons on a worksite" as their first category selection, or considered it as a possibility, and three selected "protection of workers on a project." Thus, all participants were attempting to select categories which were relevant to the goal. However, while lower rated reader participants continued to select categories related to initial schema activation, all but one of the higher rated reader participants recognized the term "imminent danger" as pertinent when they encountered it in the table of contents. As one of these participants commented, "I've come across it sometime or other. Refusal to work on grounds of imminent danger, brought back something" (21). The one higher rated reader participant who was not able to select the pertinent category commented that "Well I didn't know which word they used here...Like I was looking for something like refusal of unsafe conditions..." (1). When shown the term imminent danger in the Guide, he suggested that knowing the term might have made a difference, "...going through here I would see that...yeah, maybe it would make a difference" (1).

No lower rated reader participants recognized the relevance of the term imminent danger in the table of contents. However, as evident in Table 5.10, all but two lower rated reader participants terminated their searches before apparently reading as far as "existence of imminent danger" in the table of contents. As discussed further on, factors in addition to category selection may have hindered some lower rated reader participants' searches.

When lower rated reader participants terminated their searches, or expressed frustration with the activity, I referred them to a segment in the Employers' Guide (reproduced in Appendix B), which explains the "right to refuse" regulation and defines imminent danger. After reading this segment, five of the lower rated reader participants appeared to have extracted pertinent information from the Employers' Guide, integrated it with their search goal, and activated it to select the appropriate category in the table of contents (see Table 5.11). However, four of these participants either did not integrate or did not access this new information, including two whom I had queried about the definition. Dreher and Guthrie (1990) suggest that research about the role of prior knowledge in information searching is inconclusive. Symons (1990) for instance, reported that prior knowledge does not affect category selection. The results in this study, however, suggest that it does.

Table 5.11

Activity Three: Category Selection after the Introduction of the Term "Imminent Danger"

	HIGHER RATED READERS										LOWER RATED READERS									
	I				II						I				II					
	20	21	23	24	1	2	3	4	8		6	11	16	19	5	13	14	15	18	
Category selection																			1	
Obligations																				
Danger to persons..													1	1						
Protection...															x					
Hazards											x			x	x	x	x	2		
...imminent danger											-	-	2	2	-	1	1	-	2	
Disciplinary action											1	1						1		

x refers to categories which were considered but not sampled.

Search Plans

Participants' search plans, and whether they revised ineffective plans, were influencing factors in how efficiently they located the regulation. By search plan, I mean the way they proceeded with the search, including category selection, sampling, extracting and integrating information, and recycling. I discerned two search plan patterns: select/extract/recycle; and review/select/extract.

As shown in Table 5.12, four higher rated reader participants employed a review/select/extract plan and were successful in finding the regulation with their first category selection. Two of these participants, who had mentioned the term imminent danger, accessed that category right away:

> I'll look in the table of contents... Existence of imminent danger, page 27. Could be that one, eh. (23)

Two other participants, who had not initially mentioned imminent danger, selected that category after reviewing the table of contents, assessing possible selections. For example:

> I think I'd read through all of them first because, these, you never know... plus, then if you ask me another question, I'll have a rough idea...
> See here, dangers to persons on a worksite...
> OK, I'm just telling you what I'm thinking, dangers to persons on a worksite, me I'm thinking to myself it may be there.
> Then I go down the page, protection of workers on a project, well, if it's not there it might in that one sort of thing.
> Hazards, there's another one it might be under...
> OK, existence of imminent danger.
> After reading all these, and like I got down to this one, then when I got down to joint worksite health and safety committee and I said well maybe it could be in that one too,
> Then I got to this one, existence of imminent danger, I'd say that's the one it's under, but I'm gonna go down again and just keep reading...
> I'll go to that [existence of imminent danger] and see if it's there. (2)

Table 5.12

Activity Three: Search Strategy

	HIGHER RATED READERS										LOWER RATED READERS									
	I				II					#	I				II					#
	20	21	23	24	1	2	3	4	8	9	6	11	16	19	5	13	14	15	18	9
Search plan																				
Select/Ext/Recycle		1		1	1		1	1		5	1	2	1	1	1	1	2	2	1	9
Revise plan		+		+				+		3										
Review/Select/Ext	1	2	1	2		1	2	2	1	8		1					1	1	2	2

Five higher rated reader participants, including two who had mentioned the term imminent danger, initially employed a select/extract/recycle plan. They reviewed the table of contents, selected the first category that seemed to relate to the goal, and sampled the relevant text to see if it answered the question. One higher rated reader participant continued with this plan, checking five categories, not including the pertinent one. (The last category he checked led him to information which was adjacent to the regulation in question, which he happened to notice, with possible cuing on my part.) A second higher rated reader participant recycled twice before starting to look for the term imminent danger (he had initially decided that the regulation wouldn't have been listed under that term). The others, however, adopted a "new game plan" when their first category selections did not resolve the question. They reviewed and assessed categories before selecting another one:

> Looked at the table of contents, looked at dangers to persons on worksite, page 8, and hopefully it will tell me something and it doesn't seem to.
> ... I'm being a little more selective when I'm reading here...
> want to look back and scan through the whole thing here to make sure there isn't one that suits it better, a new game plan
> I believe I found it, but I'll keep reading
> Existence of imminent danger, there
> I'm almost three quarters of the way through, I might as well, there might be...
> OK, that's 27. (4)

For the most part, lower rated reader participants employed a select/extract/recycle plan, including three who had started with a review/select/extract approach. Only one lower rated reader participant changed from select/

extract/recycle plan to the more systematic one, but without a successful outcome.

Dreher and Guthrie (1990) found that more efficient searchers spent relatively more time in category selection than less efficient searchers. In this study, the higher rated reader participants allocated more time before selecting a category, either at the outset, or as they realized the need to do so.

Extracting and Integrating Information

All of the higher rated and a number of the lower rated reader participants were efficient in extracting information. For instance, when they turned to the text, they read the first few lines, or scanned the headings which were reproduced in the margins. One participant, for instance, noted that he was "just looking for more or less the right few words to hit, that's gonna light up in front of you" (6).

It was not possible to infer from most of the think-aloud protocols how participants were integrating extracted information with what they knew. Given the nature of the task, it seems that most participants would have employed an external consistency standard (Baker, 1985), discussed earlier, in judging whether the information extracted answered the question. The following is an example of one participant's thinking along this line: "It says the director of inspection can stop work, but it doesn't say the employee can refuse the work and tell why" (21). Other participants made such comments as "I don't see anything yet about refusing to work" (19), or "hopefully it will tell me...and it didn't seem to" (3).

Two lower rated reader participants seemed to have difficulty both with extracting information and with evaluating its relevance. Both of these participants read, paraphrased, and discussed relatively lengthy selections from the text. While they were actively relating text information to what they knew, they were getting sidetracked. For example, after deciding to check "dangers to persons on a worksite," a participant turned to page eight and commented, "I guess I'm not on the right page, because they got it broke down on the side 'improve storage and handling'" (5). He continued reading this page however, despite reaffirming that the information was not related to the goal:

> and they got licence, protection of workers on a project, so if it's not in there, I'm on the wrong page, because the next part says new project,
> so I'll just run through this protection of workers on a project.
> Now I'm reading they got one two three steps on protection of workers on a project and... (5)

At this point, the participant began to explain what he was reading:

> ...say if I was doing a project, if [the company] give me a project to do, that they want to make sure that I'm satisfied in what I got to do there, ah it says.. 'until you're satisfied that the person to whom the

> order was made has taken the measures that in the opinion of the director protects the health and safety of the workers concerned'.
> So what I'm getting out of this one is after they gives me the job and I go over and make special rules for that job, before I continue into that job they want to make sure that I am satisfied that any rules that I got there is the right rules to go by. (5)

When I asked the participant if this information answered the question, he said no, and recycled to the table of contents to select another category. The above example is typical of his continuing search. As discussed further on, this participant's search was also hampered by his perceptions of how the table of contents was organized.

Schema Access Category Selection: Text Structure

Analysis of participants' think-aloud protocols suggested how they accessed and used their knowledge of text structure (see Table 5.13). The salient data had to do with the organization of the table of contents, and with the use of section numbers rather than page numbers to access information in the text.

As already described, most participants looked through the table of contents, selecting categories which they found to be relevant to the goal. One of the lower rated reader participants took stock of how the table of contents was organized--"this is not in alphabetical order" (11), and two of the lower rated reader participants made assumptions about the organization. One assumed that the table of contents was organized in alphabetical order; he decided to "look under the r's for refusal" (19), selected "regulations," and apparently revised his thinking when he recycled to "dangers to persons." Another participant assumed that the table of contents was organized in time order; in his assumed scheme of organization, information about refusal to work would have to be listed before information about, for instance, a notice of accident or appeal:

> You see a hearing to me is after the fact because I'm looking at it the point of view the accident's over, and the protection of the worker on the project to me if I couldn't find it in the danger to workers on worksite, I may find it in there, protection, cause you're going to protect someone before the accident happens. (5)

After this participant had been referred to the Employers' Guide and had discussed the concept of imminent danger, his persistence with his first plan hindered him from reading far enough down the page to find the "imminent danger" category. After I pointed out this category, he commented:

> I wouldn't have known myself to skim the whole page because I was looking at it from a dictionary point of view....I figured they would have it in sequence, see, but it's not that way. (5)

No other participants reported taking stock of how the table of contents was organized. Two higher rated and one lower rated reader participants did refer to the table of contents as an index, although this did not seem to affect their search plans, and two of the higher rated reader participants distinguished between a table of contents and index. One described the difference: "I looked in the back because some books have it in the back and much more itemized down, in the front you have it by chapters" (1). This distinction did not influence their search plan either.

Few of the participants in either group took stock of the fact that the text was organized in numbered sections and sub-sections. Two higher rated and two lower rated reader participants seemed to realize that the numbers in the table of contents referred to sections, as this is what they looked for in extracting text. One higher rated reader participant, when about to look up a category, assessed the organization and commented on how he had learned about it, and another took stock of the structure to repair confusion early on in his search. They commented, respectively:

> Now that's another thing that used to throw me and I'm probably going to do the same thing. And its says... 27 and that's not the page number and it's not neither in this one. And for the longest time I'd be looking for a page and there's no page. (2)

> I don't know if that's a page or what it is...
> ... don't make sense.
> What I'm trying to do is get a format of this thing...
> So we're not talking page one, we're talking about section one. Got that sorted out. (3)

While initially comparing the Act with the Guide, one of the lower rated reader participants had questioned whether the numbers referred to pages or sections. He did not apply that information in the first part of his search, although he did figure out the structure later on: "Ten one must mean a section, it don't mean a page number" (5). Most participants in both groups, however, assumed that the numbers in the table of contents referred to pages. As shown in Table 5.13, all these participants realized the confusion when they attempted to look up a category, usually "existence of imminent danger," and found that there were fewer pages than category numbers. While all of the higher rated reader participants adjusted their initial assumption about structure, only half of the lower rated reader participants did. Five higher rated reader participants repaired their confusion instantly--"There's no 27, oh hang on a minute, that's not page 27, that's paragraph 27" (24), and a few carried out a brief analysis: "Don't even have a 27 here. 37? And you've got how many pages. Oh that's probably it, Oh, OK 27" (23).

Table 5.13

Activity Three: Schema Access Category Selection--Text Structure

	HIGHER RATED READERS											LOWER RATED READERS									
	I				II					#	I				II					#
	20	21	23	24	1	2	3	4	8	9	6	11	16	19	5	13	14	15	18	9
Text schema																				
Assessed structure							+			1					+					1
Looked for section					+		+			2		+		+						2
Looked for page	+	+	+	+		+		+	+	7	+		+		+	+	+	+	+	7
Awareness of mis-comprehension	+	+	+	+		+		+	+	7	+		+		-	+	+	+	+	6
Revise	+	+		+		+			+	5	+		-			+	+	-	-	3
Repair			+					+		2			-					-	[a]	1

[a] prompted by researcher

Three of the lower rated reader participants made similar adjustments, but three either gave up the search--"That's not page 27. It's not page 27, buy a new book" (16)--or recycled to select another category.

Mitigating factors

As described above, all of the higher rated reader participants, except one, were proficient in carrying out the information seeking process. Not having or not activating pertinent background knowledge seems to be a main reason for lower rated reader participants' lack of proficiency in this activity. However, affective and motivational/relevance factors also may have been involved.

Various sources suggest that affective factors may influence self-regulation. For instance, Zabrucky and Ratner (1989) suggested that less able readers' failure to regulate their reading may be the result of affective as well as cognitive factors. Fischer and Mandl (1984) found that poor readers responded to difficulties as affirmations of their failure expectations. Kletizien (1988) found that non-achieving students essentially gave up on difficult passages, while achieving students persisted.

Lower rated reader participants in this study tended to comment on the difficulty of the third reading activity, or to express low confidence or frustration with it. The following protocol excerpts provide examples:

> I don't even know how to read this thing...time for effective reading here. (14)
>
> I may never find it in this book, you've got to be a lawyer to understand it. (6)
>
> I don't know under what it's going to be, so I have to call somebody and say, what would that be under. (11)

These views may have influenced participants' decisions to terminate the activity before completing it.

Goodman (1984) suggests that readers make deliberate decisions to terminate a reading activity, and that the decision may be based on inability to comprehend or disinterest as well as having reached the end of the task. Low motivation or interest in completing the task may also have been a factor in some participants stopping the activity before completion: There was no real reason for them to locate the information in question. Two lower rated reader participants terminated this activity after unsuccessfully selecting only one or two categories.

Four lower rated reader participants were able to complete the activity with some assistance, namely being introduced to the concept of imminent danger. This suggests that they were able to regulate their reading on this activity, once they had additional resources to do so.

Summary

In this chapter, I described and compared the self-regulation of higher rated and lower rated reader participants. Participants were engaged in three reading activities and asked to think aloud about how they were reading as they completed them. All participants were able to complete the first two activities successfully. Only higher rated reader participants were able to complete the third one.

There were a number of similarities and some differences between higher rated and lower rated reader participants' self-regulation for the first two activities. Marked differences between the two groups of participants were apparent for the third one.

Some differences in background knowledge and its application were suggested or were apparent to a greater or lesser degree in all of the activities. On the first activity, higher rated reader participants may have been using background knowledge more actively by employing a visualizing strategy. (Only one lower rated reader participant reported using this strategy, and he did so after completing the activity.) During the second reading activity, higher rated reader participants had prior knowledge of a particular topic, which was not shared by most lower rated reader participants. On the third reading activity, higher rated reader participants accessed background knowledge which enabled them to accomplish the task, while lower rated reader participants did not.

As well as accessing background knowledge related to the third reading activity, higher rated reader participants were more systematic than lower rated ones in planning, monitoring and revising strategy use. However, responses of the lower rated reader participants during the last activity suggested that affective or motivational/relevance factors may have influenced their reading.

CHAPTER SIX

SUMMARY AND IMPLICATIONS

During the last ten years there has been a resurgence of interest in literacy for employment. Contemporary reports argue that there is both an increase in demand for literacy for employment, and an increase in the level of literacy which is now required. Reasons commonly stated to support these arguments include the need to be more competitive in a de-regulated global market place, increased use of technology, shifts from hierarchical to participatory styles of management, requirements for recurrent training, and needs of workers' organizations in the face of changing workplaces.

To help workers to develop their literacy to meet new demands, insights about this increased or "advanced" level of literacy are needed. Recent attempts to define advanced level literacy have included a reasoning/problem solving focus, suggesting that insights about it may emerge from research about reading metacognition. Such research has been concerned with metacognitive knowledge, or what readers know about how they read, and with self-regulation, or how readers regulate their reading.

Research with children and adults in academic settings has pointed to differences in metacognition as a key factor in reading proficiency. Research with adults outside of academic settings, while limited in scope, has resulted in similar conclusions. However research about reading metacognition with adults in workplaces is very limited, and further studies in workplace settings are required.

To this end, I carried out a descriptive study in an Alberta industry. I described and compared aspects of metacognitive knowledge and of self-regulation of front-line supervisors. Eighteen participants were recruited on the basis of previous ratings of reading ability; all participants were able to meet job related reading demands, but had achieved higher or lower ratings on reading tests. I anticipated that differences in metacognition between the higher and lower rated reader participants might suggest directions for literacy program planning and instruction.

Participants were interviewed regarding metacognitive knowledge of person, task and strategy, then asked to complete three reading activities and to think-aloud about how they were reading as they completed them. The reading activities included comparing information in two documents, selecting passages of interest and stating their main ideas, and locating information in a document.

I analyzed interview and think-aloud protocols, drew conclusions about participants' metacognitive knowledge and self-regulation of reading, and compared the findings for the higher rated reader participants with those for the lower rated ones.

Summary of Key Findings

Higher rated and lower rated reader participants demonstrated similar metacognitive knowledge, particularly in the areas of task and strategy, and they demonstrated similarity in self-regulation as they read to compare information and as they read to construct main ideas. There were some differences in metacognition of person between higher rated and lower rated reader participants, and some differences in their self-regulation on the information finding reading activity. There were also differences in their apparent use of background knowledge, and possibly, in the way affective and motivational/relevance factors influenced self-regulation. In addition to findings about metacognitive knowledge and self-regulation, the study yielded some insights about the research methodology. Key findings and their implications are outlined below.

Key Findings: Metacognitive Knowledge

Metacognitive Knowledge of Person

1. There was not a distinct difference in how participants in each group rated their reading ability in comparison with others they worked with. Of the participants who rated themselves as more able or less able readers than others, only higher rated reader participants suggested they were more able, and only lower rated reader participants suggested they were less able. However, most participants in both groups rated their reading ability as average.

2. All participants mentioned pace as a factor in reading. However, higher rated reader participants were more likely than lower rated ones to mention comprehension as a factor in reading, while lower rated reader participants were more

likely to mention a concern with reading aloud.

This difference could suggest that higher rated reader participants were more likely to hold a meaning oriented view of reading, while some lower rated ones held a word oriented view. However, lower rated reader participants' responses may have reflected their awareness of difficulties and discomfort with oral reading, rather than of a word oriented view of reading per se. (Supervisors are frequently called on to read orally.) Their responses to later questions about task and strategy did suggest a meaning oriented view of reading.

3. Both higher rated and lower rated reader participants mentioned education and practice as key factors in developing reading ability. However, higher rated reader participants were more likely than lower rated ones to suggest interest, attitude, and motivation as additional factors in people becoming more able readers.

4. Most participants in both groups reported little outside of work reading. However, their responses on this topic suggest that a) higher rated reader participants seemed more likely than lower rated ones to view themselves as readers; b) lower rated reader participants may have been more inclined than higher rated ones to equate outside of work reading with "reading books"; and c) higher rated reader participants may have held an attitude which made them more inclined towards reading than lower rated reader participants.

5. Higher rated reader participants were neither more nor less likely than lower rated reader participants to be interested in or aware of news events. From this it was inferred that higher rated reader participants were no more likely than lower rated ones to view literacy as a means to participation.

Metacognitive Knowledge of Task

1. Higher rated and lower rated reader participants reported reading at work for between 1 and 3 hours each day. Lower rated reader participants tended to report a higher number of hours than higher rated ones, although participants reported a similar range of reading tasks.

2. Participants in both groups mentioned unfamiliar topics and vocabulary as possible sources of difficulty in a text.

3. Responses about purposes for reading at work suggest that higher rated reader participants may have been more likely than lower rated ones to have a broad understanding of the roles of paperwork in the company management and organization.

4. Participants in both groups suggested it was necessary for supervisors to be able to read and write in order to do their jobs. Some mentioned changes in the workplace as factors influencing needs for reading and writing ability.

5. More higher rated than lower rated reader participants suggested that front-line workers could do their jobs without being able to read and write.

Metacognitive Knowledge of Strategy

1. Higher rated and lower rated reader participants mentioned similar strategies for dealing with incoming paperwork, and participants in both groups noted the importance of knowing what information to look for.

2. Regarding passing information on to co-workers, some lower rated reader participants were more likely to say they would read out a whole text to them, so as not to omit any information.

3. Both higher and lower rated reader participants mentioned dictionary use and use of context as main strategies for figuring out unknown words.

4. Both higher rated and lower rated reader participants said that they would ask others for help with material which they did not understand. They also mentioned helping co-workers who have difficulty with reading, and said that as supervisors it was their role to explain information to the people they supervised.

Key Findings: Self-regulation

Strategy Use

1. Participants in both groups were able to successfully complete two reading activities: comparing the content of two documents, and selecting passages of interest and stating their main idea. However, only higher rated reader participants were able to complete a third, information finding reading activity successfully. On this activity, the higher rated reader participants used more efficient

strategies than the lower rated ones did, and were more likely to adjust initial strategies if they were ineffective.

1.1 From this it could be inferred that the higher rated reader participants were more proficient than the lower rated ones in completing this particular activity. It is not possible to infer whether the higher rated reader participants are more proficient readers in general.

1.2. On the second, main-idea reading activity, higher rated and lower rated reader participants used similar strategies to select passages of interest and to construct main ideas. Participants in both groups provided a range of types of main idea responses. While most responses were textually based, participants in each group provided some contextually based responses and some erroneous ones. (Lower rated reader participants' performance on the main-idea finding task may have reflected previous instruction regarding such tasks.)

Background Knowledge

1. From responses to questions about metacognitive knowledge, participants in both groups appeared to understand the role of background knowledge in reading. However, while completing the reading activities, higher rated reader participants seemed to have or to access background knowledge which lower rated reader participants either did not have or did not access.

1.1. A number of higher rated reader participants reported using a visualizing strategy during the first reading activity, while only one lower rated reader participant mentioned using this strategy. This may suggest more active use of background knowledge by higher rated reader participants. However, related research is inconclusive.

1.2. On the second reading activity, higher rated reader participants knew about changes in management arrangements in a different area of their industry, while the majority of lower rated reader participants did not. Having or not having this knowledge influenced how participants completed a main-idea construction task, although participants in both groups were able to accomplish the task.

1.3. On the third reading activity, all but one of the higher rated reader participants were familiar with or recognized the term "imminent danger." Knowledge of or recognition of this term enabled these participants to complete the information finding task efficiently and successfully. The lower rated reader participants (and one higher rated reader one), who did not know or recognize the term, were less efficient and were unable to complete the task independently.

Affective and Motivational Factors

1. Some lower rated reader participants' efforts to carry out the third reading activity may have been influenced by affective factors. Although they demonstrated that they were able to understand what they were reading, some expressed concern about the unfamiliar structure of the text and about their ability to read it.

2. Some lower rated reader participants terminated the third reading activity before completing it. Their reading may have been influenced by motivational or relevance factors: There was no real purpose for them to complete the task.

Key Findings: Methodology

1. While the texts and tasks used for this study were typical for this workplace, the context for completing the tasks was not natural. Some participants commented that they would read differently in an actual work situation. As noted in the above section on self-regulation findings, the non-natural context may have influenced, in particular, lower rated reader participants' performance on the information finding activity.

2. Participants were able to think aloud about their reading self-regulation.

3. I divided participants into two groups--one with higher test ratings and one with lower test ratings--in order to compare metacognition and self-regulation of participants in the two groups. This grouping may have caused me, initially, to look for or to emphasize differences which were not as strong as I first thought. I had to be careful to guard against doing this.

In retrospect, it could have been possible to accomplish the purposes of the study without dividing the participants into two groups. In this case, I could have described the metacognition and self-regulation of all of the participants, and made comparisons among them. This approach would have focused on the range of characteristics among participants.

4. The framework which I used to collect and analyze data on

metacognition proved satisfactory. However, the framework I had intended to use to analyze self-regulation proved to be too general. I had to find and adapt more specific frameworks for this aspect of analysis.

Comment on Key Findings

Participants in this study, who were all relatively able readers, demonstrated a range of metacognitive knowledge and self-regulation. As well, some participants who showed proficiency in completing some reading tasks were not as proficient in completing another one. These findings support emerging views that proficient adult readers are a diverse group with a range of skills. They also affirm that reading is multifaceted rather than unitary, and that reading proficiency may vary across tasks.

Participants' comments about how they consult others when faced with difficult reading tasks, and about how they help others who are having difficulty, support views about the inter-related nature of reading and oral language communication in workplaces.

Implications

I had anticipated that differences in metacognitive knowledge and self-regulation between higher rated and lower rated reader participants would have implications for planning literacy programs and instruction, and would lead to questions for further research. I found that there were many similarities in both areas among the participants as well as some key differences. Both the similarities and differences have implications for programming and for research, as outlined below.

Implications for Programming

Holistic, Broad-Based Approaches

1. Higher rated reader participants appeared to have or to access background knowledge which the lower rated reader participants did not have or did not access. As well, they were more likely to mention comprehension as a factor in reading and to mention interest and motivation as factors in developing reading ability. They may have been more likely to have a broad understanding of the role of paperwork in maintaining the organization.

These findings lend support for literacy programming which enables workers to extend their knowledge while developing reading strategies. They argue against narrowly focused, job-specific workplace literacy programs, and in favour of broad, work-related experiences.

2. Participants noted that they ask others for help when they don't understand a text, and that they help others who may have difficulty with reading. Such collaboration must be affirmed and encouraged. The roles and relationship of reading, speaking and listening need to be recognized in planning programs and instruction needs to allow for group work and discussion.

3. The importance of context and relevance, including purposes for reading, became evident in this study. The relationships of reader, text and context must be recognized in planning assessment and interpreting results, and in planning instruction.

4. Given some participants' views about outside of work reading as "book reading," it may be appropriate to use materials from outside of work as well as from the workplace for strategy instruction and practice, in order to help participants extend their views about "what counts as reading."

5. A number of both the higher rated and lower rated reader participants demonstrated low interest in news of events

that seemingly affected them. Yet, much of the current discussion about workplace literacy relates to global changes. Workplace literacy programs might have a role in promoting awareness and understanding of world events and issues which affect the workplace and the workers.

Strategy Instruction

1. Programs need to account for the range of reading tasks and variety of strategies that relate to those tasks, and to provide instruction and practice in carrying out those tasks. Thus, program materials need to be pertinent in relation to the workplace and in relation to strategy instruction.

2. One of the goals of instruction and practice would be to enable participants to select appropriate strategies in relation to texts, tasks, contexts and their own resources.

3. Findings demonstrate that readers in non-academic settings are able to think aloud about their reading. Think aloud methodology could be used for assessment and instruction. The frameworks used to analyze self-regulation in this study could be used for planning assessment and instruction.

4. This study was conducted with participants who are relatively able readers. Strategies used by participants could be taught to less able readers. At the same time, differences in strategy use across reading activities suggests that relatively able readers could benefit from strategy instruction regarding some tasks.

5. Analysis of the main idea related activity showed that participants made a range of main idea responses. Programs could provide instruction about the range of types of main idea responses and about when to apply them.

6. Participants commented that practice supports reading ability development. However, lower rated reader participants who were practising by reading outside of work were not as proficient in some tasks as higher rated reader ones who reported less outside of work reading. Programs could provide guided practice with various texts and tasks.

7. Lower rated reader participants mentioned concerns about reading aloud. Instruction and practice in oral reading could be provided so that workers can develop oral reading confidence and fluency as required.

Implications Regarding Workplace Literacy

1. There is a need to distinguish between the importance of knowing information and being able to access that information in a text. For example, regarding the information finding reading activity in this study, all participants knew that a worker has a right to refuse work that appears to be dangerous, even though the lower rated reader participants could not locate the pertinent regulation in the *Occupational Health and Safety Act*. At the same time, workers should be able to refer to the source of the information if and when they need or choose to.

2. Participants suggested that occupational workers can get by without being able to read. These views differ from common views about needs for reading at work. They suggest that workers need to be involved in identifying needs and planning for literacy development initiatives. They also raise questions about how to encourage participation in literacy programs.

Implications for Use and Development of Workplace Texts

1. Participants' assessment of the easier to read *Employer's Guide to the Occupational Health and Safety Act*, along with the differences in performance on the related reading activity, lend support for making information accessible through plain English materials. At the same time, workers and others could benefit from learning the language and organization of more complex texts in order to have direct access to the information in those texts.

Implications for Research

Research Methodology

1. Participants were able to think aloud about their reading. Think-aloud methodology could be used in further research in similar settings.

2. Much of the interview data about metacognitive knowledge suggested similarities rather than differences among the participants, except in relation to metacognition of person.

Regarding further research about metacognitive knowledge, it may be useful to consider relationships between metacognition of person and self-regulation. Questions about task and strategy may be better dealt with through self-regulation studies.

3. There is a need for research in actual workplace settings which can account for the influence of context and relevance as well as of reader-text interaction.

Research Questions: Metacognitive Knowledge of Person

1. Although all of the participants in the study were relatively able readers, some lower rated reader participants seemed not to view themselves as "readers." How widespread are such views among relatively able readers and what is the relationship between such views and reading proficiency?

2. Higher rated reader participants were more likely than lower rated ones to mention comprehension as a factor in reading. Do some lower rated readers hold similar views but not mention them, or do they not hold such views? If the later, how widespread is this difference among relatively able readers and how does the difference relate to reading proficiency?

3. Some higher rated reader participants may have had an attitude towards reading which made them more inclined to read. Is there a relationship between this attitude and reading proficiency?

Research Questions: Self-regulation

Background knowledge.

1. While there appears to be a relationship between background knowledge and strategy use in the information finding reading activity, it cannot be determined from this study just what the relationship is.

1.1. Would the higher rated readers have been as efficient in their information finding activity if they had not known or recognized the term "imminent danger"? Would the lower rated reader participants have been more efficient in their search if they had known or recognized the term?
Further research could consider strategy use among readers when given a series of similar tasks on familiar and unfamiliar topics, and with known and unknown vocabulary.

1.2. Why is it that higher rated reader participants seemed to have and to have accessed background knowledge which lower rated reader participants did not seem to have or access? How did they develop this knowledge when the lower rated reader participants did not, given similarities in work experiences?

2. Is there a relationship between higher rated reader participants' likelihood of mentioning comprehension as a factor in reading, their possibly broader understanding of the purposes of workplace paperwork, and their background knowledge availability and use?

Strategy use.

1. How did the higher rated reader participants develop their strategies for information finding, given the similarity of workplace reading requirements between the higher rated and lower rated participants?

1.1. Would proficient readers who are not involved in this or a similar workplace have been able to find, for instance, the information in the information finding activity? Would they have applied similar strategies as the higher rated reader participants? In other words, do some readers develop information finding strategies which they can apply efficiently in most situations?

2. Higher rated reader participants were more likely than lower rated ones to mention visualizing as a strategy.

2.1. Does this relate to their more overt focus on comprehension and their possibly broader background knowledge?

2.2. Did the lower rated reader participants visualize but not mention this strategy?

2.3. Does instruction in visualizing help readers to become more proficient readers?

Related Research

1. Participants suggested that occupational workers can get by without being able to read. This contradicts contemporary thinking about demands for reading at work and suggests a need for research about the literacy and information requirements of workers, from their points of view, and about the roles of reading in accessing information.

Concluding Comments

In this chapter, I have provided an overview of my study and a summary of key findings and their implications for programming and further research. In closing, I want to raise a point that, while not central to the study, is central to workplace program development and research.

In my literature review, I found that the majority of arguments advocating workplace literacy development focused on needs to be competitive in a global marketplace and on related shifts in technology use and management styles. Concurrent arguments tend to outline costs which are thought to result from low literacy, such as low productivity, workplace accidents, training, and low morale.[1] An implication of such arguments is that workers with low literacy skills are somehow to blame for current economic difficulties.

This view contrasts sharply with my beliefs and with my experience in carrying out this workplace study. From the start of my association with the company where I did the study, I was impressed with the stance of the Supervisory Development Centre that reading ability was not a measure of supervisory ability or workers' skill. Less capable readers were not viewed as a liability. Rather, literacy development was promoted as a way to support employees' learning and development at work and in general.

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[1] As I was revising this chapter, I received a proposal for a study about literacy initiatives in Canada. These economic costs were outlined in the proposal as a rationale for doing the study. Other examples of such "costing" are referred to in chapter 1 of this thesis.

Workplaces and employment prospects are changing. How can literacy development help workers and others to be proactive in addressing these changes? I hope the findings of this study will contribute, in some ways, to program development and research concerned with this question.

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APPENDIX A

INTERVIEW QUESTIONS

Name:____

Position:____

Length of time in position:_______

Position prior to becoming a supervisor:____________________

Length of time with [the company]:_______________

A. Establishing context

1. How is your work going? (Have their been changes in the last year? Any new developments or challenges?)

2. What are some examples of reading that you do for your job?

2.1 About how much time do you spend reading at work in a day?

3. Do you read outside of work?

3.1 What kinds of things do you read outside of work?

B. Reading and awareness of world issues

4. Do you read the newspaper? Which newspaper(s)?

4.1 Which sections do you read?

4.2 How do you decide what to read?

4.3 How else (how) do you keep up on the news?

5. Here are some newspaper headlines about some recent events. If you were looking through a newspaper that included these headings, which ones would you probably want to read about?

5.1 Why?

5.2 Could you tell me what you know about these headings?

5.3 What can you tell me about the other headings?

5.4 Do the people you work with discuss the news?

C. Metacognitive knowledge

6. What are some purposes for the reading/writing you do at work?

6.1 Do you have to read to accomplish those purposes? (Are there other ways?)

7. What do you think is the overall purpose for all of the reading and writing that you and everyone else at [the company] have to do at work?

7.1 Is there more paperwork now than there was when you started at [the company]? (Why do you think there is more now?)

7.2 What would happen if all of the paperwork were eliminated?

7.3 What differences would there be in how people do their work if there were no reading or writing?

7.4 Are there some reading/writing tasks that could be done away with? Which ones?

8. In your day to day reading at work, do you find some things easier to read than others? Can you give me some examples? What makes some things harder than others to read?

9. Suppose you come back to work after a shift off, and your in-basket is full of things to read. How do you deal with them?

9.1 How do you decide to read something or not?

10. How do you decide what information to pass on to the people you supervise?

10.1 How do you pass on the information?

11. What do you do if you are reading something and you don't understand it or part of it?

12. What do you do when you are reading and there are words you don't know the meaning of?

13. How would you rate your ability as a reader compared to others you work with: the same, more able, or less able?

14. Does a person have to be a capable reader to work as a supervisor at [the company]?

14.1 Does a person have to be a capable reader to work as an occupational at [the company]?

15. What are some signs that a person is a capable reader?

16. What are some signs that a person might have difficulty with reading?

16.1 What are some reasons that a person might have difficulty with reading?

16.2 What would a person need to do to become a more able reader?

D. Questions for course participants

17. How has the course influenced your reading and writing at work? Outside of work?

18. What kinds of things do you do now with reading/writing that you didn't do before you took the course?

19. Are there other changes in how you do your work that happened as a result of the course?

20. Do you have any suggestions for changing the course?

APPENDIX B

TEXTS FOR READING ACTIVITIES

TEXT USED IN READING ACTIVITY ONE

(Excerpt from Safe Work Procedure)

Written permission to reprint not obtained.

TEXT USED IN READING ACTIVITY ONE

(Excerpt from Proper Task Analysis Worksheet)

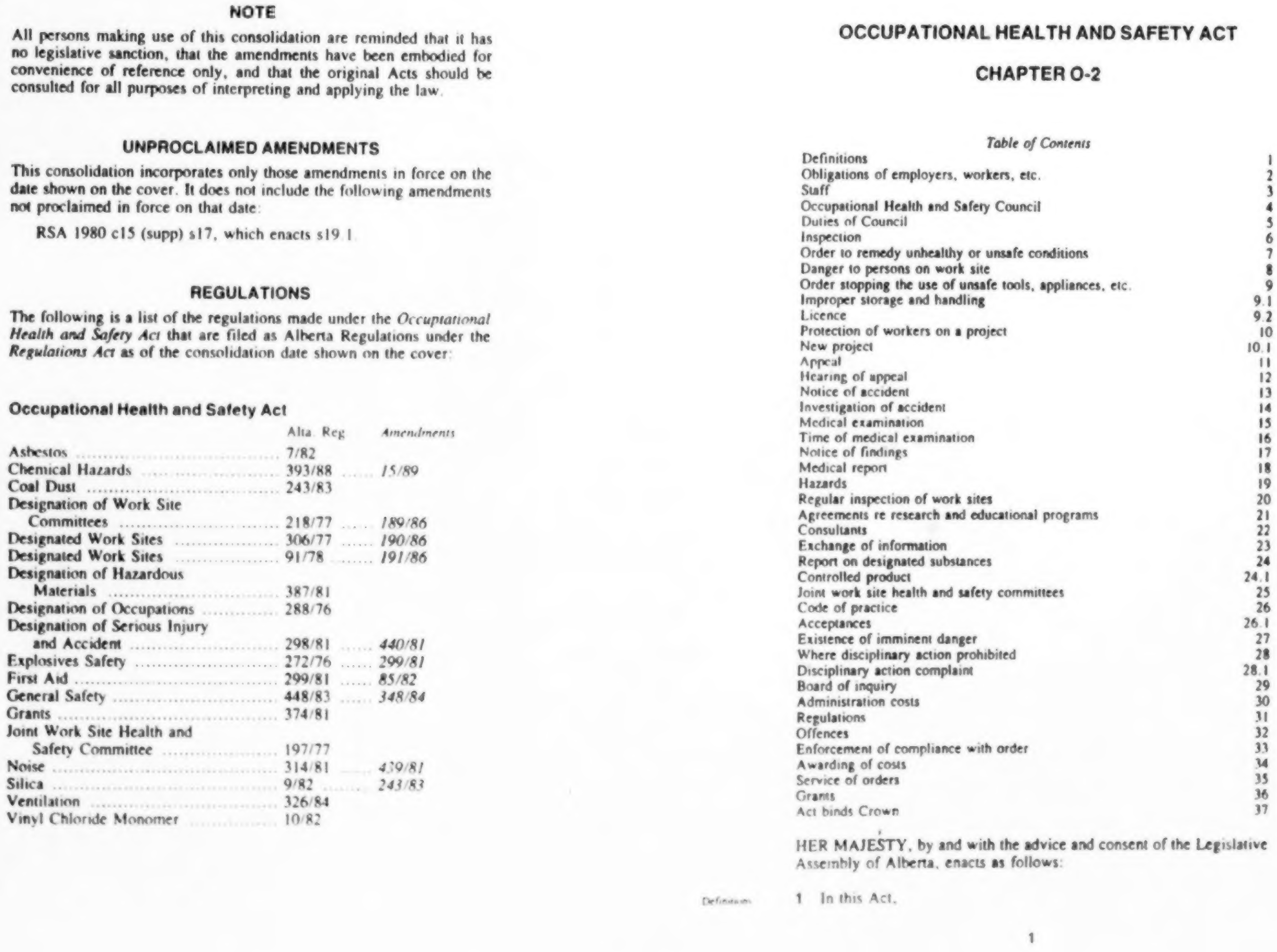
Written permission to reprint not obtained.

TEXT USED IN READING ACTIVITY TWO

(Excerpt from company newsletter)

Written permission to reprint not obtained.

TEXT USED IN READING ACTIVITY THREE



NOTE

All persons making use of this consolidation are reminded that it has no legislative sanction, that the amendments have been embodied for convenience of reference only, and that the original Acts should be consulted for all purposes of interpreting and applying the law.

UNPROCLAIMED AMENDMENTS

This consolidation incorporates only those amendments in force on the date shown on the cover. It does not include the following amendments not proclaimed in force on that date:

RSA 1980 c15 (supp) s17, which enacts s19.1.

REGULATIONS

The following is a list of the regulations made under the *Occupational Health and Safety Act* that are filed as Alberta Regulations under the *Regulations Act* as of the consolidation date shown on the cover:

Occupational Health and Safety Act

	Alta. Reg	*Amendments*
Asbestos	7/82	
Chemical Hazards	393/88	*15/89*
Coal Dust	243/83	
Designation of Work Site Committees	218/77	*189/86*
Designated Work Sites	306/77	*190/86*
Designated Work Sites	91/78	*191/86*
Designation of Hazardous Materials	387/81	
Designation of Occupations	288/76	
Designation of Serious Injury and Accident	298/81	*440/81*
Explosives Safety	272/76	*299/81*
First Aid	299/81	*85/82*
General Safety	448/83	*348/84*
Grants	374/81	
Joint Work Site Health and Safety Committee	197/77	
Noise	314/81	*439/81*
Silica	9/82	*243/83*
Ventilation	326/84	
Vinyl Chloride Monomer	10/82	

OCCUPATIONAL HEALTH AND SAFETY ACT

CHAPTER O-2

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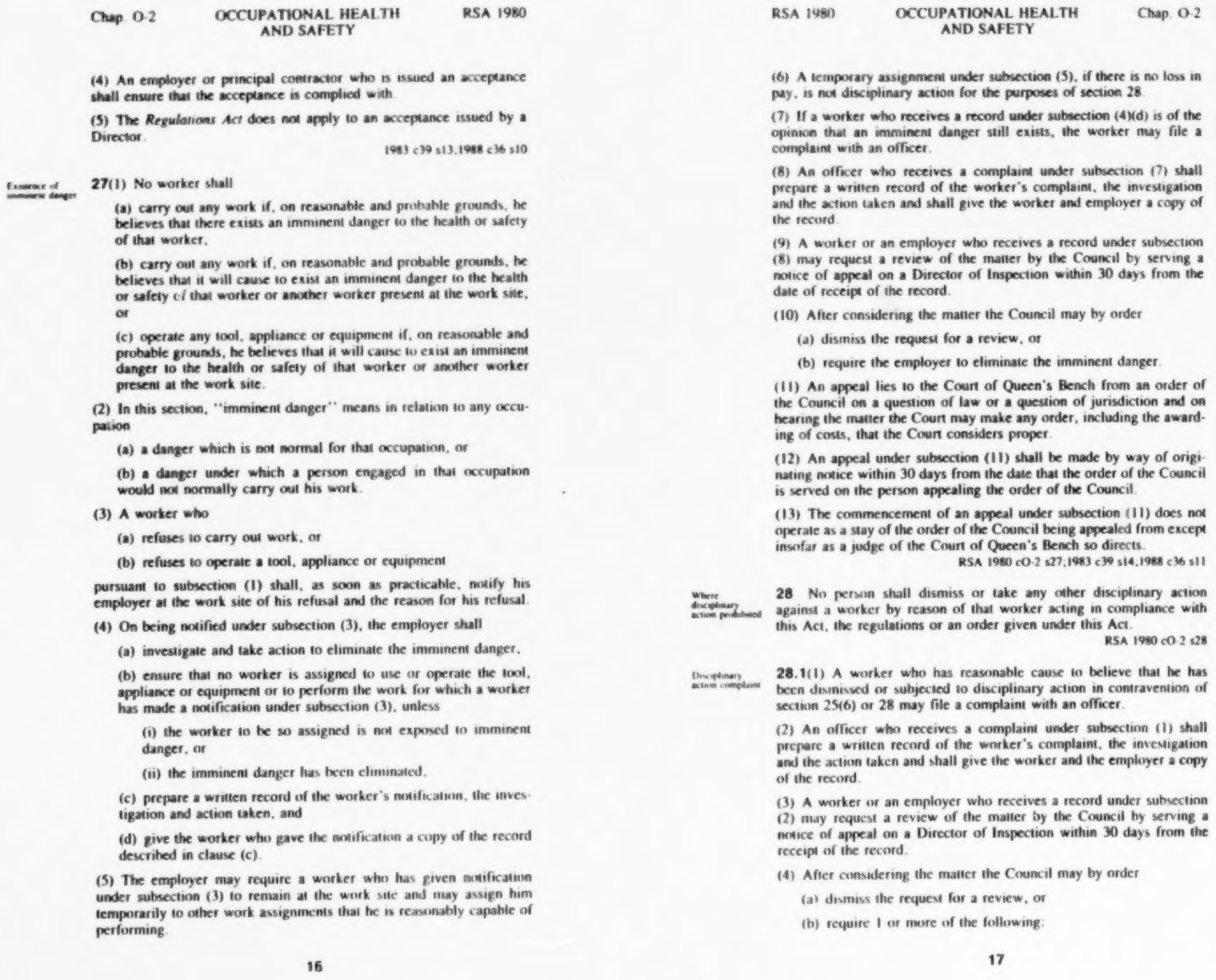
HER MAJESTY, by and with the advice and consent of the Legislative Assembly of Alberta, enacts as follows:

Definitions 1 In this Act,

Photreduced excerpt from: Province of Alberta. (1989). Occupational Health and Safety Act. Office Consolidation. Edmonton, AB: Queen's Printer.

TEXT USED IN READING ACTIVITY THREE



(4) An employer or principal contractor who is issued an acceptance shall ensure that the acceptance is complied with.

(5) The *Regulations Act* does not apply to an acceptance issued by a Director.

1983 c39 s13;1988 c36 s10

Existence of imminent danger

27(1) No worker shall

(a) carry out any work if, on reasonable and probable grounds, he believes that there exists an imminent danger to the health or safety of that worker,

(b) carry out any work if, on reasonable and probable grounds, he believes that it will cause to exist an imminent danger to the health or safety of that worker or another worker present at the work site, or

(c) operate any tool, appliance or equipment if, on reasonable and probable grounds, he believes that it will cause to exist an imminent danger to the health or safety of that worker or another worker present at the work site.

(2) In this section, "imminent danger" means in relation to any occupation

(a) a danger which is not normal for that occupation, or

(b) a danger under which a person engaged in that occupation would not normally carry out his work.

(3) A worker who

(a) refuses to carry out work, or

(b) refuses to operate a tool, appliance or equipment

pursuant to subsection (1) shall, as soon as practicable, notify his employer at the work site of his refusal and the reason for his refusal.

(4) On being notified under subsection (3), the employer shall

(a) investigate and take action to eliminate the imminent danger,

(b) ensure that no worker is assigned to use or operate the tool, appliance or equipment or to perform the work for which a worker has made a notification under subsection (3), unless

(i) the worker to be so assigned is not exposed to imminent danger, or

(ii) the imminent danger has been eliminated,

(c) prepare a written record of the worker's notification, the investigation and action taken, and

(d) give the worker who gave the notification a copy of the record described in clause (c).

(5) The employer may require a worker who has given notification under subsection (3) to remain at the work site and may assign him temporarily to other work assignments that he is reasonably capable of performing.

(6) A temporary assignment under subsection (5), if there is no loss in pay, is not disciplinary action for the purposes of section 28.

(7) If a worker who receives a record under subsection (4)(d) is of the opinion that an imminent danger still exists, the worker may file a complaint with an officer.

(8) An officer who receives a complaint under subsection (7) shall prepare a written record of the worker's complaint, the investigation and the action taken and shall give the worker and employer a copy of the record.

(9) A worker or an employer who receives a record under subsection (8) may request a review of the matter by the Council by serving a notice of appeal on a Director of Inspection within 30 days from the date of receipt of the record.

(10) After considering the matter the Council may by order

(a) dismiss the request for a review, or

(b) require the employer to eliminate the imminent danger.

(11) An appeal lies to the Court of Queen's Bench from an order of the Council on a question of law or a question of jurisdiction and on hearing the matter the Court may make any order, including the awarding of costs, that the Court considers proper.

(12) An appeal under subsection (11) shall be made by way of originating notice within 30 days from the date that the order of the Council is served on the person appealing the order of the Council.

(13) The commencement of an appeal under subsection (11) does not operate as a stay of the order of the Council being appealed from except insofar as a judge of the Court of Queen's Bench so directs.

RSA 1980 cO-2 s27;1983 c39 s14;1988 c36 s11

Where disciplinary action prohibited

28 No person shall dismiss or take any other disciplinary action against a worker by reason of that worker acting in compliance with this Act, the regulations or an order given under this Act.

RSA 1980 cO-2 s28

Disciplinary action complaint

28.1(1) A worker who has reasonable cause to believe that he has been dismissed or subjected to disciplinary action in contravention of section 25(6) or 28 may file a complaint with an officer.

(2) An officer who receives a complaint under subsection (1) shall prepare a written record of the worker's complaint, the investigation and the action taken and shall give the worker and the employer a copy of the record.

(3) A worker or an employer who receives a record under subsection (2) may request a review of the matter by the Council by serving a notice of appeal on a Director of Inspection within 30 days from the receipt of the record.

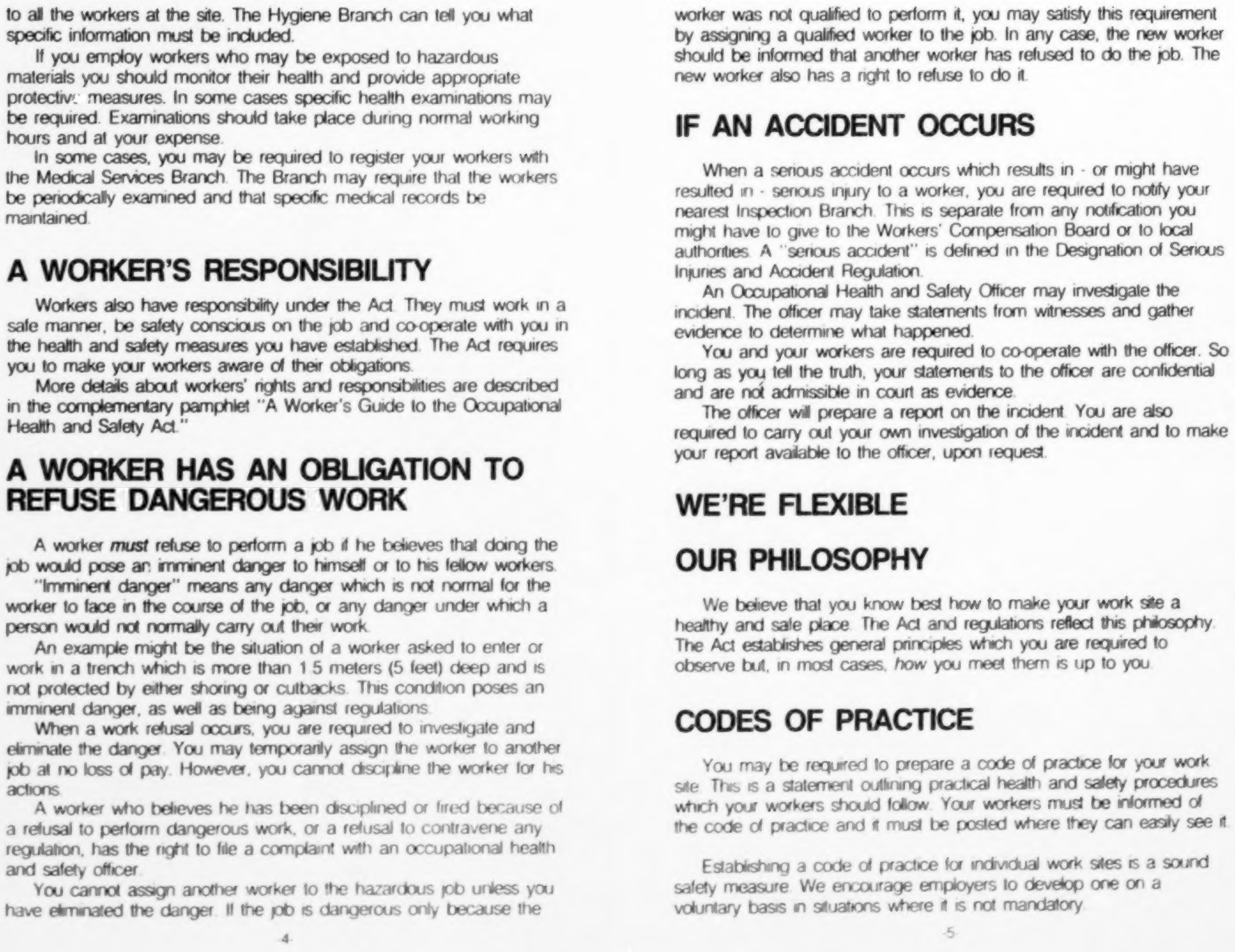
(4) After considering the matter the Council may by order

(a) dismiss the request for a review, or

(b) require 1 or more of the following:

Photreduced excerpt from: Province of Alberta. (1989). Occupational Health and Safety Act. Office Consolidation. Edmonton, AB: Queen's Printer.

TEXT USED IN READING ACTIVITY THREE



to all the workers at the site. The Hygiene Branch can tell you what specific information must be included.

If you employ workers who may be exposed to hazardous materials you should monitor their health and provide appropriate protective measures. In some cases specific health examinations may be required. Examinations should take place during normal working hours and at your expense.

In some cases, you may be required to register your workers with the Medical Services Branch. The Branch may require that the workers be periodically examined and that specific medical records be maintained.

A WORKER'S RESPONSIBILITY

Workers also have responsibility under the Act. They must work in a safe manner, be safety conscious on the job and co-operate with you in the health and safety measures you have established. The Act requires you to make your workers aware of their obligations.

More details about workers' rights and responsibilities are described in the complementary pamphlet "A Worker's Guide to the Occupational Health and Safety Act."

A WORKER HAS AN OBLIGATION TO REFUSE DANGEROUS WORK

A worker *must* refuse to perform a job if he believes that doing the job would pose an imminent danger to himself or to his fellow workers.

"Imminent danger" means any danger which is not normal for the worker to face in the course of the job, or any danger under which a person would not normally carry out their work.

An example might be the situation of a worker asked to enter or work in a trench which is more than 1.5 meters (5 feet) deep and is not protected by either shoring or cutbacks. This condition poses an imminent danger, as well as being against regulations.

When a work refusal occurs, you are required to investigate and eliminate the danger. You may temporarily assign the worker to another job at no loss of pay. However, you cannot discipline the worker for his actions.

A worker who believes he has been disciplined or fired because of a refusal to perform dangerous work, or a refusal to contravene any regulation, has the right to file a complaint with an occupational health and safety officer.

You cannot assign another worker to the hazardous job unless you have eliminated the danger. If the job is dangerous only because the

worker was not qualified to perform it, you may satisfy this requirement by assigning a qualified worker to the job. In any case, the new worker should be informed that another worker has refused to do the job. The new worker also has a right to refuse to do it.

IF AN ACCIDENT OCCURS

When a serious accident occurs which results in - or might have resulted in - serious injury to a worker, you are required to notify your nearest Inspection Branch. This is separate from any notification you might have to give to the Workers' Compensation Board or to local authorities. A "serious accident" is defined in the Designation of Serious Injuries and Accident Regulation.

An Occupational Health and Safety Officer may investigate the incident. The officer may take statements from witnesses and gather evidence to determine what happened.

You and your workers are required to co-operate with the officer. So long as you tell the truth, your statements to the officer are confidential and are not admissible in court as evidence.

The officer will prepare a report on the incident. You are also required to carry out your own investigation of the incident and to make your report available to the officer, upon request.

WE'RE FLEXIBLE

OUR PHILOSOPHY

We believe that you know best how to make your work site a healthy and safe place. The Act and regulations reflect this philosophy. The Act establishes general principles which you are required to observe but, in most cases, *how* you meet them is up to you.

CODES OF PRACTICE

You may be required to prepare a code of practice for your work site. This is a statement outlining practical health and safety procedures which your workers should follow. Your workers must be informed of the code of practice and it must be posted where they can easily see it.

Establishing a code of practice for individual work sites is a sound safety measure. We encourage employers to develop one on a voluntary basis in situations where it is not mandatory.

Photoreduced excerpt from: Alberta. Community and Occupational Health, Occupational Health and Safety Division. An employer's guide to the Occupational Health and Safety Act. Edmonton, AB: Queen's Printer. Reprinted with permission.

APPENDIX C

NEWS HEADLINES

Mandela's bark worse than ANC's bite

Hungarian minister sees new Europe coming

Meech backers say only the public can save accord

Canada's tough UI reform mirror of U.S., says expert

Cuts in U.S. led to patchwork of state benefits

The crippling cod crisis

Fishermen victims of badly managed resource

Axworthy backs Chretien in race

'He warrants support' from West

Reform Party looks for left-wingers

GST called defence against overspending

Thunder Bay votes on English

Alderman says bilingualism too costly

Joyful crowds dance in streets of Soweto

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